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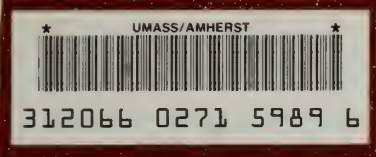

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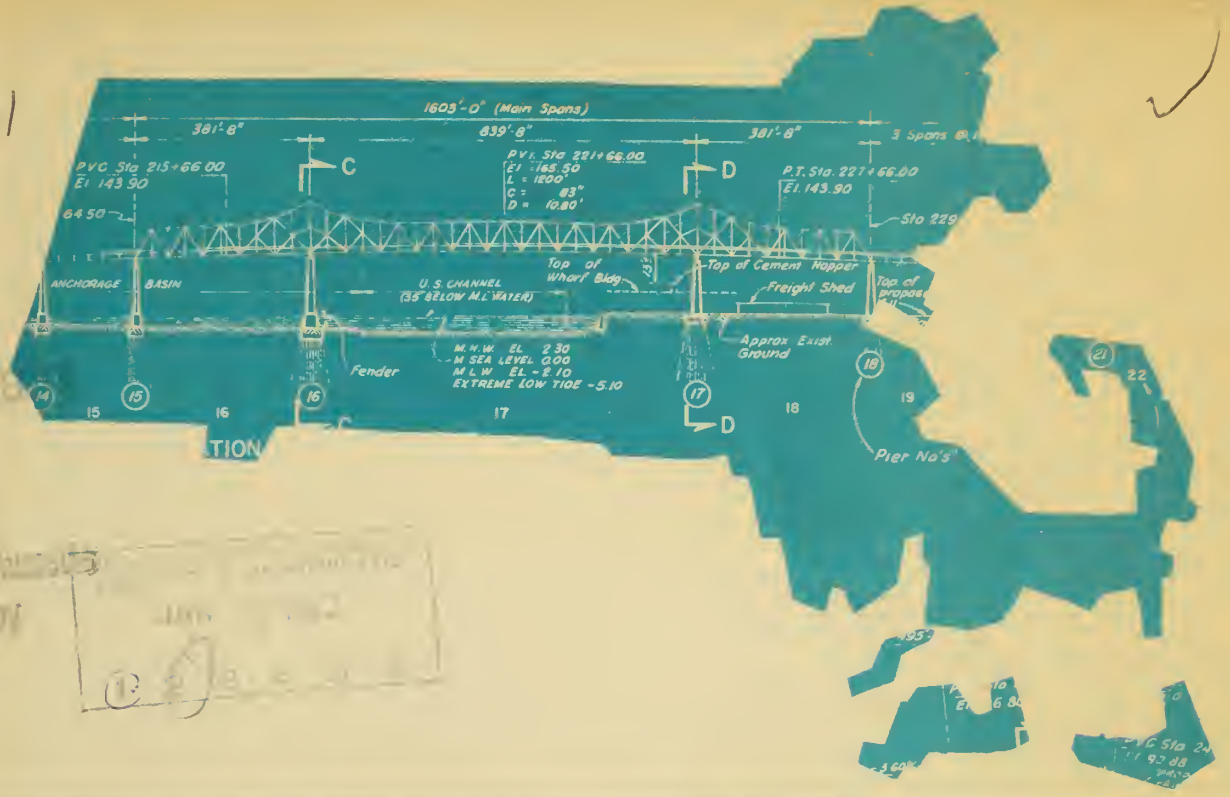
a report of progress to Governor JOHN A. VOLPE



on the massachusetts highway program

..... and other department activities

— fall 1961

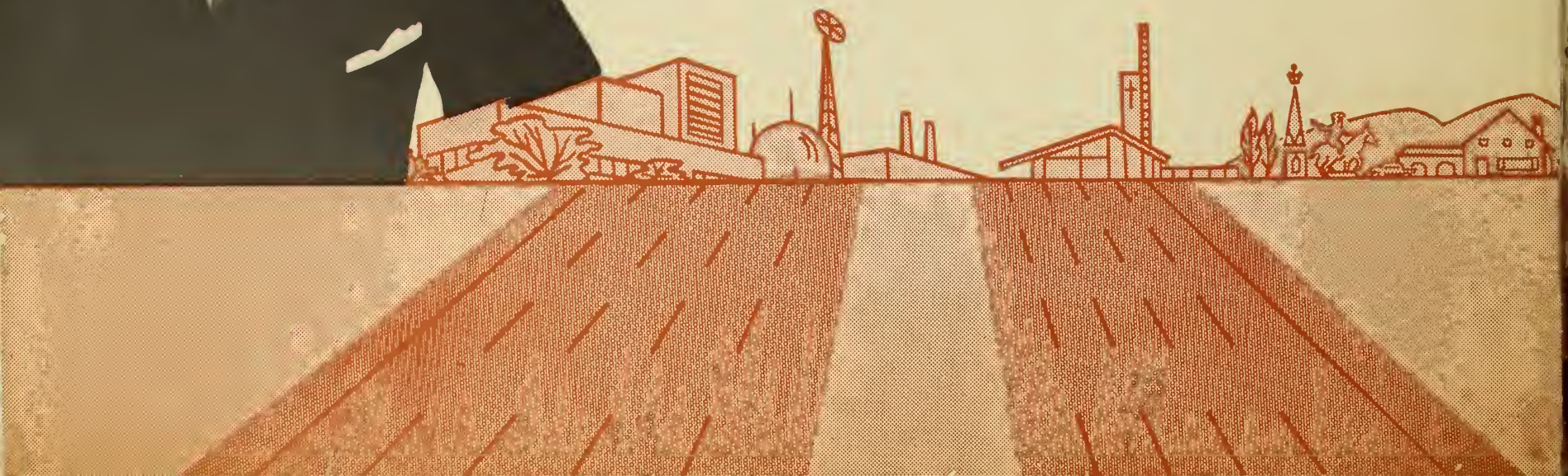
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

JACK P. RICCIARDI
COMMISSIONER

His Excellency

JOHN A. VOLPE

Governor



FOREWORD

This is a report on the Department's program of progress from October 1960 through October 1961. It encompasses a total picture of statewide construction progress on both highways and waterways.

Of particular interest is the record of steady accomplishment in developing the Federal Interstate and Defense Highway System and the Primary, Secondary and Urban Federal-Aid Systems.

The accompanying report is an up-to-date picture of Department achievements in every division, including many innovations to improve Department efficiency. It also outlines goals we have set for future accomplishment.

I am proud to present this report which reflects the outstanding services performed for the Commonwealth by the employees of this Department.

Jack P. Ricciardi, Commissioner
Massachusetts Department of Public Works

JACK P. RICCIARDI
Commissioner

GEORGE C. TOUMPOURAS · FRED B. DOLE
Associate Commissioners

EDWARD J. McCARTHY
Chief Engineer

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Superstructure nearing completion on double-deck bridge between Lawrence and North Andover -- Interstate 495.

WHERE WE HAVE BEEN . . .

During the period of October 1, 1960 to October 1, 1961, the Department of Public Works awarded construction contracts totaling $99,388,294.60 for highway projects.

On October 1, 1961, the Department carried the following summary of major highway construction:

	Number	Miles	Bid Cost
Projects under construction	65	104.7	$119,934,459.26
Projects awarded-pending start	4	5.0	7,058,456.70
Projects bids received-award pending	4	2.0	17,886,302.15
Projects advertised-pending opening of bids	5	6.6	718,331.00
	78	118.3	$145,597,549.11

A U.S. Bureau of Public Roads report shows that Massachusetts has climbed in the past year from 47th in the list of states to 23rd position, in advancing completion of the Interstate and Defense Highway System. Also, Massachusetts has risen to 12th place in the 50 states in utilizing available funds on the Federal-Aid Secondary System.

a review of department achievements in 1961

PROGRESS ON INTERSTATE SYSTEM

In the year since last October 1960, a total of 25.2 additional miles of Interstate and Defense Highway were completed. This brought to 215.3 miles the total of Interstate mileage in operation, or 48% of the approved total mileage of 447.9 miles. As of October 1, 1961, there were another 39.5 miles of Interstate Highway under construction. A little over 193 miles remain under design or study. Estimated cost to complete the balance of the Interstate System was $665,289,000.

Important Interstate highway sections opened to traffic during the past year were: the first mileage on the Outer Belt (I-495) in Chelmsford and Westford; sections on I-93 in Methuen, Winchester, Woburn, Stoneham and Medford; a Longmeadow-Springfield section of I-91 and another section of the Worcester Expressway (I-290).

PROGRESS ON ABC SYSTEMS

During the period from October 1960 to October 1961, the Department reconstructed or relocated 43.2 miles of ABC highways. As of October 1, 1961, there were an additional 54.8 miles of ABC highways under construction. These included the three categories of primary, secondary and urban highways.

Notable ABC highway developments include: the opening of a 4.4 mile extension of Route 3 northerly through Chelmsford, Westford and Tyngsborough; opening of another 4.5 miles of Pilgrims Highway through Hingham, Rockland, Norwell and Hanover; completion of widening of Route 128 in Lynnfield and Wakefield and the near completion of the interchange at Routes 1 and 128 in those communities; opening of Horseneck Beach Road; and ground-breaking for the new Route 113 connector of I-495.

INNOVATIONS WE HAVE MADE

Massachusetts Highway Conference

With "Share the Knowledge" as its theme, the Department of Public Works held its First Annual Massachusetts Highway Conference on May 24, 1961. About 400 Highway superintendents and engineers from 285 municipalities and counties attended. Department experts delivered talks on modern highway design, traffic engineering, state aid procedures, surface and bridge maintenance, snow and ice control and roadside maintenance. The Commissioner related the Department services available to the municipalities. The conference, held at 100 Nashua Street, Boston, was so successful that it was decided to hold it semi-annually, alternating between Boston and a city elsewhere in the Commonwealth. A second conference on state aid and maintenance was held October 25, 1961 at the University of Massachusetts in Amherst.

THE COMMONWEALTH OF MASSACHUSETTS

In the Year One Thousand Nine Hundred and Sixty-one

RESOLUTIONS COMMENDING THE DEPARTMENT OF PUBLIC WORKS UPON THE ESTABLISHMENT OF AN ANNUAL MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS HIGHWAY CONFERENCE.

Whereas: The First Annual Massachusetts Department of Public Works Highway Conference has been planned and will be held on Wednesday, May 24th, 1961 at the Department of Public Works Building, 100 Nashua Street, Boston; and

Whereas: Participants in this conference will include the personnel of the department of public works of the commonwealth and of the public works departments of the counties, cities and towns of the entire commonwealth; and

Whereas: New research techniques, developments and ideas, and the necessity of mutual co-operation in the sharing of this knowledge in the intra-state functions of county, city, town and commonwealth department of public works, with the resulting benefits to the public and the resultant saving of tax dollars will derive from this conference; and

Whereas: Such timely topics as:
(1) Services and information available to the municipalities;
(2) Modern highway design;
(3) Traffic engineering;
(4) State aid procedures;
(5) Surface maintenance;
(6) Maintenance of structures;
(7) Snow and ice control; and
(8) Roadside maintenance
will be included in the agenda of the conference for the benefit of the participating county, city and town departments; and

Whereas: This first in the history of the department of public works reflects most creditable on the entire personnel of said department; therefore be it

Resolved: That the General Court of Massachusetts hereby extends its most sincere congratulations to Commissioner Jack P. Ricciardi, his associate commissioners, George C. Tsamparas and Fred B. Dole, and the entire personnel of the department of public works for their activities above and beyond the call and ordinary requirements of their state service; and be it further

Resolved: That a copy of these resolutions be forwarded by the Secretary of the Commonwealth to the department of public works.

Adopted Massachusetts State Senate
and
Massachusetts House of Representatives
May 1961

John E. Powers
Hon. John E. Powers
President

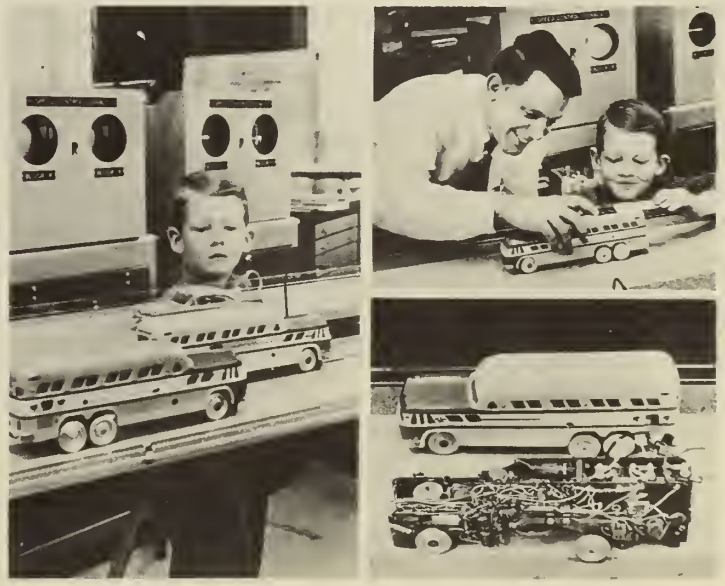
John F. Thompson
Hon. John F. Thompson
Speaker

Travel Trash Collections

An increasingly bothersome problem has been the dumping of refuse along state highways, particularly at the roadside rest areas. To combat this nuisance, the Department let out pilot contracts to private firms for the first time to collect travel trash along highways in the southeastern part of Massachusetts and on Cape Cod, including the vacation travel routes-- 3, 24, 128 and the Mid-Cape Highway. The problem had become so acute that some essential highway maintenance work was necessarily neglected.

Automated Highway

Commissioner Ricciardi asked that Massachusetts be considered by the U.S. Bureau of Public Roads as a testing ground for the revolutionary new automated highway. He suggested that one such test highway should be located in the northeastern region of the nation where the varied climatic conditions would give it a fair test. Interstate Route 93, from Medford to the New Hampshire line, and Interstate 95, from Boston to the Rhode Island line at Attleboro were suggested as ideal test highways. The proximity of a large pool of skilled electronic scientists and technicians in Massachusetts and the Department of Public Works' existing relationship with the Massachusetts Institute of Technology were cited as compelling reasons for locating the automated highway here. An automated highway would be of tremendous safety value, eliminating driver fatigue by relieving the motorist of the tasks of steering, acceleration and deceleration and would regulate traffic flow.



Prequalification of Contractors

The Department is requesting legislation to establish a system of prequalification of contractors. Contractors would submit to the Department a financial statement, an inventory of their equipment, a report on the extent of their work force and experience. Analyzing these factors, the contractor would be given a maximum capacity rating and it would be easily determined if said contractor has adequate resources in terms of finances, manpower, equipment and experience to undertake work for the Commonwealth. A study has been made in cooperation with the New England Road Builders Association. Presently, Massachusetts is one of but nine states which does not have a prequalification system.

New Exit Numbers on Major Routes

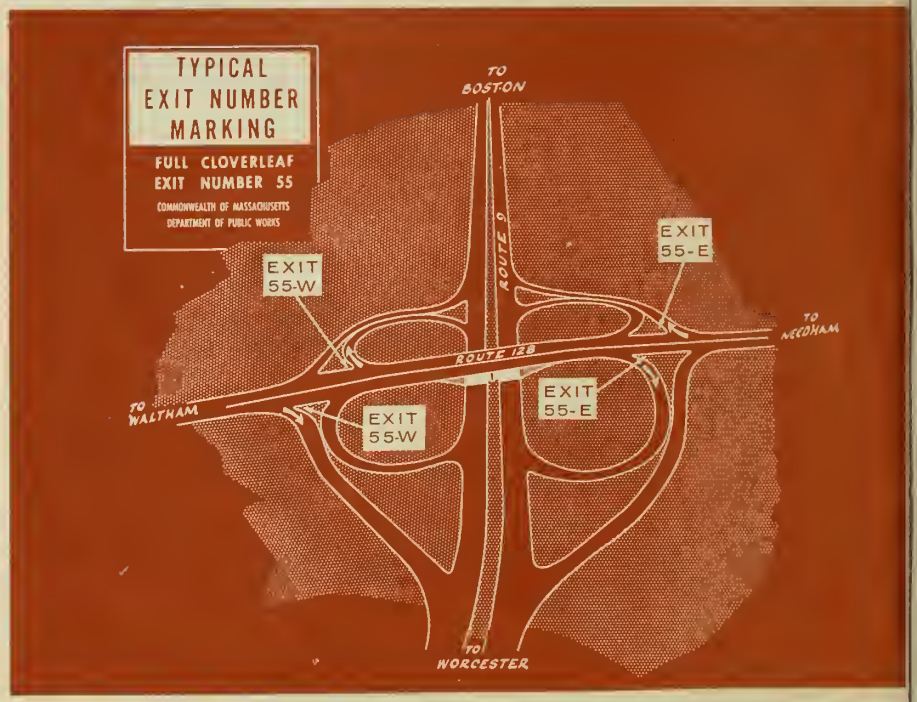
A new exit numbering system, devised by the Traffic Division, went into effect this past year on the Southeast Expressway and on Route 3 from Route 128 to Tyngsborough. In addition, all of the exits on Route 128 from Gloucester to Braintree will be renumbered effective April 1, 1962. The new exit numbers on Route 128 will reflect changes caused by the construction of new interchanges and cloverleafs. At a full cloverleaf, exits will be numbered with the letters N, S, E or W added to indicate the direction of the exit ramp. Also, in each instance where a limited access highway crosses or meets Route 128, the exits on that particular highway will be numbered #25 for ease of memory. This will not apply to the Interstate and Defense Highway System since such numbering has not been permitted thus far by the U.S. Bureau of Public Roads.

Traffic Improvements

Improvements in traffic engineering include: continual investigation of a suitable method of coding accidents to determine accident-prone locations;

Use of double alternating electrical arrows at the termini of completed portions of construction projects to channelize traffic from three lanes to one lane;

Initiation of a study relative to installation of an emergency telephone system on limited access highways.



Right of Way

Several changes have been made in the Right of Way Division to bring Department policies and procedures up to standards required by the U.S. Bureau of Public Roads.

Greater dependence will be placed on the appraisals made by the staff personnel. A training and recruitment program is being initiated to improve the quality of staff appraisals and a new staff appraisal report form has been put into use to facilitate preparation of complete and adequately documented appraisal reports.

Selection of fee appraisers is now being made by the Right of Way Engineer and Assistant Right of Way Engineer, subject to approval of the Board of Commissioners. Formerly an Associate Commissioner chose all fee or "outside" appraisers. Qualifications of fee appraisers will be under continuous review.

A Right of Way progress chart has been instituted which shows at a glance the current status on a monthly basis of each project layout. A flow chart with outline has been devised to aid in clarifying the complicated landtaking process. The Right of Way Manual is being updated and will reflect latest Bureau of Public Roads' directives.

Civil Defense

At the direction of the Commissioner, the Department's Civil Defense program was stepped up to meet the requirements of the changing international situation. Under this program, all personnel in the Department headquarters, District offices and all other buildings will be instructed and drilled in evacuation, shelter and fallout protection procedures. Also, key Department personnel will be trained in the field use of radiological equipment and will act as instructors of other personnel who might be required to work with rescue or repair crews. The services of Department instructors will also be offered to prime contractors.

Codification of Highway Laws

The Department petitioned the Legislature to codify the highway laws of Massachusetts. At the present time, statutes affecting highways are scattered through many chapters of the General Laws. The bill was referred to a study. If adopted, it will result in greater efficiency in the Department of Public Works.

Civil Service

The Department will petition the Legislature again in 1962 to authorize oral civil service examinations for promotion to administrative positions. Many extremely well qualified engineers, entirely capable of administering a division, have encountered difficulties with formulas and memory tests on written examinations due to the many years since they left college. This bill was rejected in the last session.

Construction Improvements

The standard specifications for highway and bridge construction, adopted in 1953 and since supplemented by numerous amendments, are now being revised to conform to the latest developments and practices in the field of highway engineering.

Among the changes are new specifications for the materials to be allowed and the compaction densities to be required, to achieve a high standard of stability in embankments upon which new pavements must be constructed.

Much new testing equipment has been and is being secured to equip small laboratories in the plants producing the materials for construction of pavements, to ensure local control at these plants and reduce the testing load at the District laboratories and main laboratory at Wellesley.

To insure the integrity of welding done in the fabrication of steel girders or for important butt welds, the Department now calls for examination of the welds by x-ray or by the magnetic particle method.

A construction materials inspector has been assigned to travel state-wide. His duties are to inspect Department testing procedures, the weighing of bituminous concrete and cement concrete being shipped to all Department projects and to insure that proper controls and uniform testing equipment are being used at plants. In addition, he reviews specifications requirements with the plant inspectors.

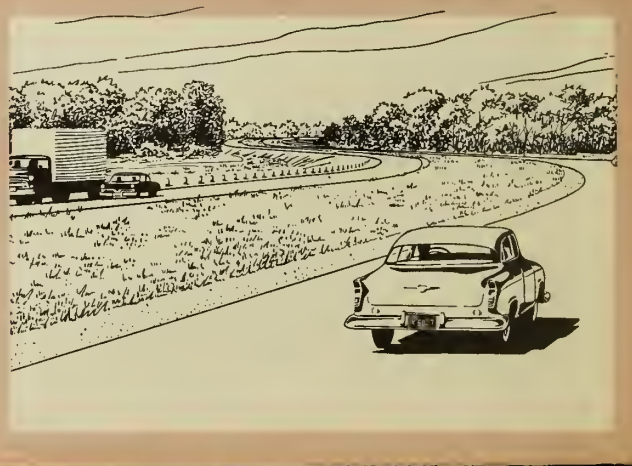
Bidding & Contract Changes

The rules and regulations for bidding on work of value of less than $1,000 have been revised. The Department now requires bids to be solicited for all work above $200 in value.

Maintenance Improvements

Further steps were made by the Maintenance Division in the areas of grass inhibiting development and expanded use of chlorides (salt) in snow and ice control. All grassed areas on 65 miles of highway along Route 9 from Brookli to Worcester, and Route 128 from Wellesley to Westwood, were treated with growth inhibitor, using ingenious Department-designed spray booms and vehicles. It is expected that the use of the inhibitor chemical, maleic hydrazide (M.H. 30) will reduce mowings on median strips from 11 cuttings to 3 annually and roadside mowings from 5 to 2 annually.

By increased use of chlorides in the winter of 1960-61, the quantity of sand used in snow and ice control operations was reduced by 136,000 tons while an additional 22,000 tons of sodium and calcium chlorides were used. The extra cost of the chlorides has been more than offset by the use of less equipment for spreading the chlorides and the reduction in the cost of the spring cleanup. This more efficient method of snow and ice control will be expanded



Research Program with University of Massachusetts

A contract has been signed with the University of Massachusetts for a cooperative research program on all phases of roadside development. High on the priority list of projects under this contract will be a study to determine the course of action to be taken by the Department in treating the sand dune problem in Provincetown.

Electronic Computer

An electronic computer section has been established for the engineering forces. An IBM 1620 was installed in October 1961 and is in operation. Previously, the engineers had access to the IBM 650 for only two hours per day, as the Accounting Division required it for the balance of the time. IBM 650 engineering programs are being rewritten for use on the IBM 1620. In anticipation of increasing productivity through use of the IBM 1620, the Department has been sending engineers to the IBM training school to increase proficiency in the use of this new computer, and to learn new programming techniques. Many sections of the Highway Divisions have found that use of the computer is very helpful. When the IBM 650 system is replaced by the IBM 1401 system for accounting, the total cost of both new systems will be no more than that of the present 650 system, yet the computing potential for both Engineering and for Accounting will be greatly increased.

In-Service Training

Over the past 10 years, the Department has been unable to attract graduate civil engineers because of low starting salary and difficulty of advancement. Consequently, through Lowell Technological Institute, an In-Service Training Program has been initiated. The program, of five years duration, three nights a week, on the employees' own time, leads to the degree of Associate in Engineering. This program is now in the second semester and a work-rotation program has been established so that newer employees may receive experience in all the major divisions of the Department.

Over 275 employees successfully completed the first semester, Classes are held in 13 different locations throughout the State. This makes it easy for the student to commute and at the same time convenient for construction and survey personnel to continue their education if reassigned to a different area.

Walkie-Talkie Survey Units

The Department has purchased small, portable, two-way radios for better communications between the transitman and others in the survey party. This will improve safety conditions and increase the efficiency of the party.

WHERE WE ARE GOING

Department Plans

The Massachusetts Deparment of Public Works has a full program of work in progress.

In accordance with the wishes of the Legislature, work is programmed to benefit every area of the Commonwealth-- be it urban, surburban or rural.

Department planners must, perforce, adopt priorities for scheduling highway projects, since funds are limited. Major factors involved include traffic needs and highway safety.

Following is an outline of anticipated major highway projects-- both on the Interstate System and the Primary, Secondary and Urban (ABC) Systems-- which will be initiated or continued in the coming year.

Note: Projects will be listed according to whether they are in the layout stage (right of way takings filed), to be advertised, under construction, under survey and/or design.

METROPOLITAN BOSTON

INTERSTATE (layout only)

I-93 - Medford-Somerville: From end of present construction to Foss Park. Due to existing legislation, it may not be possible to accomplish this in fiscal 1962.

INTERSTATE (under construction)

I-93 - Medford: Continue extension southerly from Riverside Avenue across the Mystic River to Medford-Somerville line.

INTERSTATE (under survey)

I-695 - Boston: Continue survey of Charlestown section of Inner Belt.

ABC (to be advertised)

Route 128 - Weston: Route 30 to Mass. Turnpike, in Fall of 1961.
Woburn: Forest Park Avenue to Burlington line, in Fall of 1961.

ABC (under construction)

Newton-Wellesley-Weston: Mass. Turnpike to Wellesley-Newton line.
Waltham-Weston: North of Route 117 to south of River Street, Weston.
Lexington-Waltham: North of Route 2 to north of Route 117.
Lexington: North of Routes 4 & 225 to north of Route 2.
Burlington: Woburn town line to Route 3A.
Woburn: West of I-93 to Forest Park Avenue.

ABC (under survey & design)

Boston: Government Center access streets will be surveyed and designs prepared.

ABC (to be advertised)

Alford Street - Boston: In Spring of 1962.

MERRIMACK VALLEY-NORTH OF BOSTON

INTERSTATE (layout only)

I-495 Haverhill-Merrimac: Giles Street to east of Merrimac town line.
Haverhill-Methuen: Westerly Bridge over Merrimack River.
Lawrence-Methuen: From Incinerator Road to westerly bridge over Merrimack River.

INTERSTATE (to be advertised)

Haverhill: From River Street to Giles Street in Winter of 1961-62.
North Andover-Lawrence: On section from North Andover line to Incinerator Road in Winter of 1961-62.
Andover-Lawrence: From Corbett Road to North Andover line in Winter of 1961-62.
Andover: From I-93 to Corbett Road in Winter of 1961-62.

INTERSTATE (under construction)

I-495 Haverhill: Two sections of highway and the East bridge over the Merrimack River.
Lawrence: One contract completed in Fall of 1961.
Andover: Two sections completed in late Fall of 1961.
Andover-Tewksbury: One section completed in late Fall of 1961.
Tewksbury: One section to be completed in Spring of 1962.
Chelmsford-Lowell-Tewksbury: This section to be completed in Fall of 1963.
Littleton-Westford: Final completion expected in Spring of 1962.

ABC (under construction)

Route 113 - Methuen

Route 125 Connector and relocation - Haverhill.

Route 125 Reconstruction - North Andover.

Lowell Connector - Chelmsford-Lowell.

SOUTHEASTERN MASSACHUSETTS

INTERSTATE (layout only)

I-95 North Attleborough-Mansfield-Foxborough: From Route 152 to Cocasset Street, Foxborough.

INTERSTATE (to be advertised)

I-95 Attleboro: Rhode Island line to Route 1A in Spring of 1962, paving contract. Actual advertising date will depend on status of adjacent R.I. project.

I-195 Fall River: Three sections. Taunton River Bridge to Fall River Western Expressway, Spring of 1962; Western Expressway to Plymouth Avenue, late in 1962; Plymouth Avenue to Eastern Avenue, Spring of 1962. For these three sections, the layouts are to be filed and construction advertised as noted.
Fall River-Westport: A fourth section from Eastern Avenue to Westport line. Layout has been filed and is scheduled for early advertising.

INTERSTATE (under construction)

I-95 Attleboro-North Attleborough: A grading contract for about 3 miles from vicinity of South Avenue northerly.

I-195 Fall River-Somerset: Taunton River Bridge

Fall River: Durfee Street Viaduct expected to be completed in Summer of 1962.

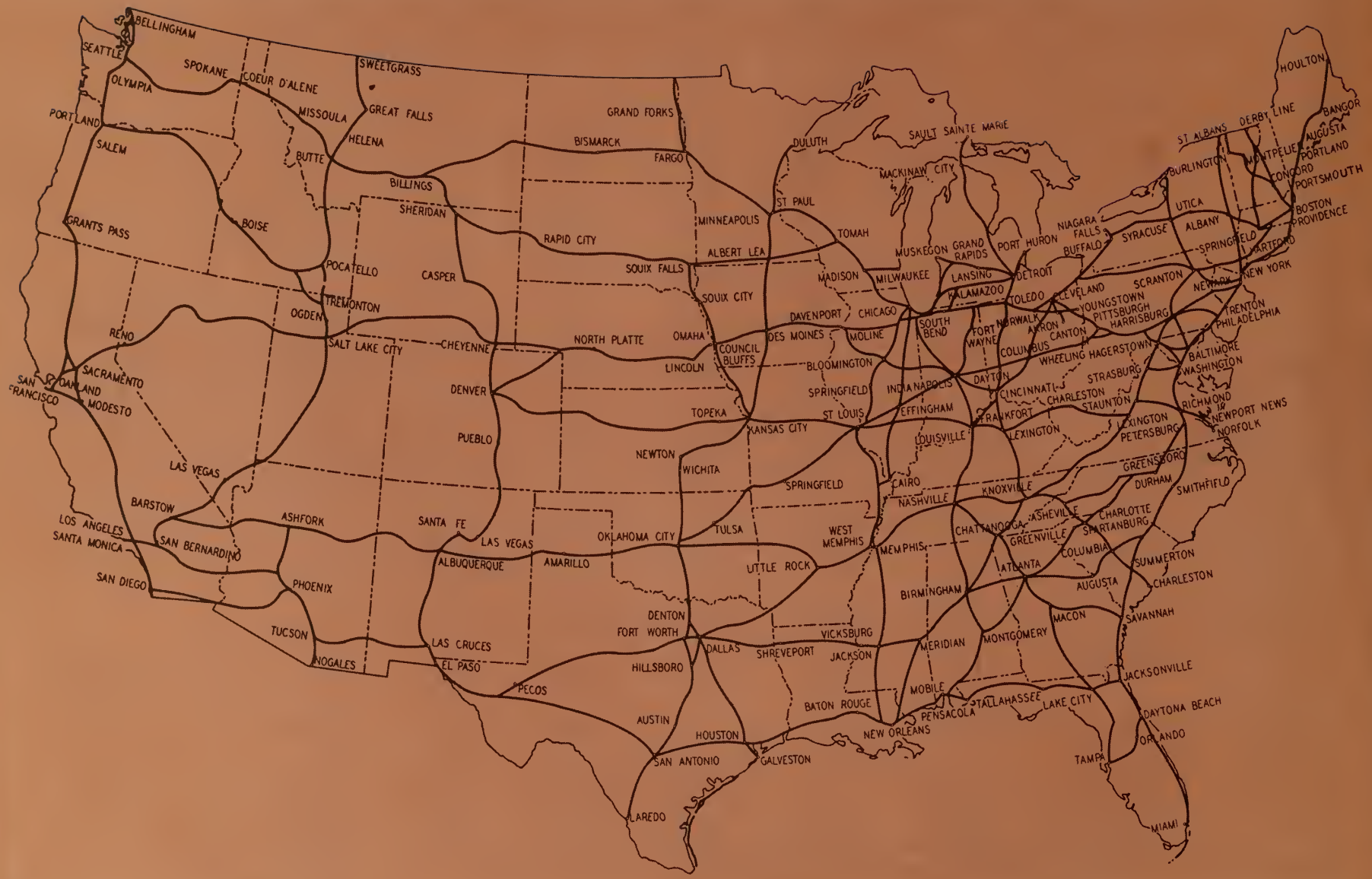
Somerset-Swansea: Completion expected in Summer of 1962.

Final Apportionment of Federal-Aid Highway Funds

Authorized for the Fiscal Year 1963

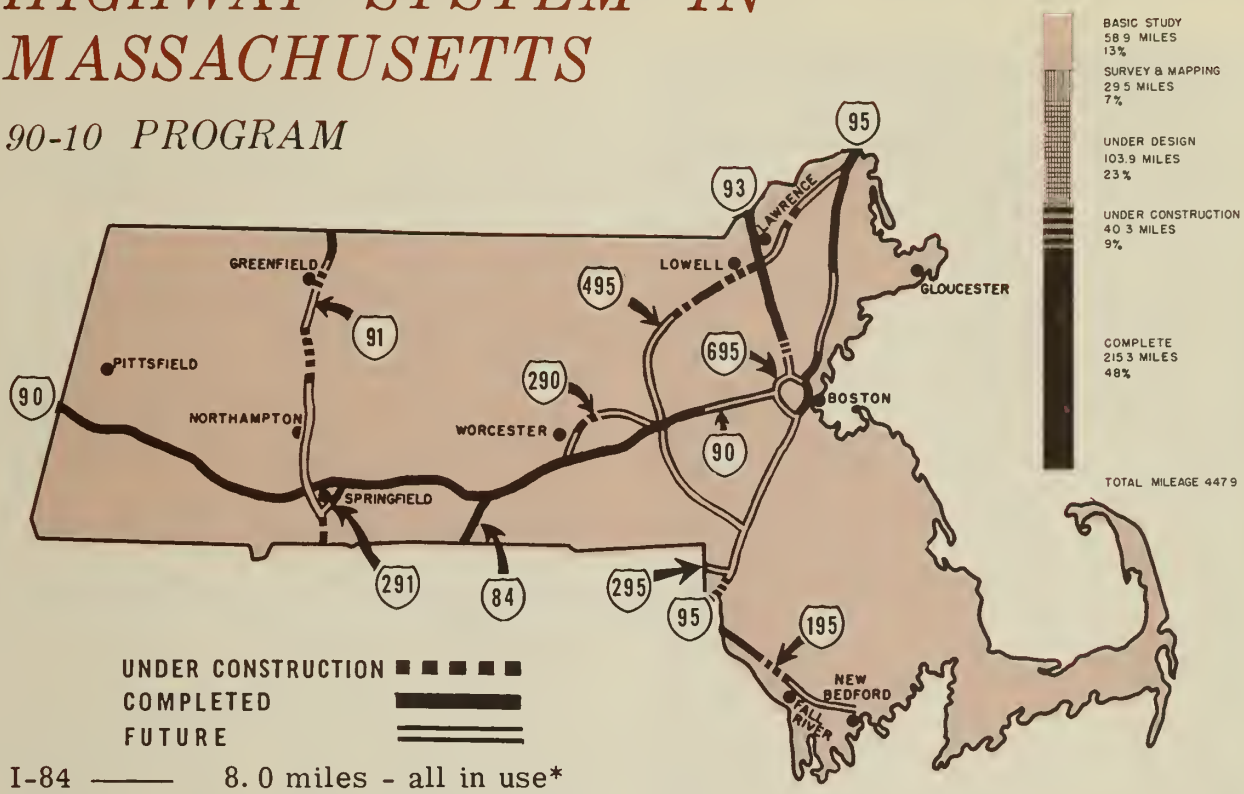
	Primary highway system ($416,250,000)	Secondary or feeder roads ($277,500,000)	Urban highways ($231,250,000)	Subtotal ($925,000,000)	Interstate system ($2,400,000,000)	Total ($3,325,000,000)
Alabama	$7,569,509	$5,818,263	$3,107,018	$16,494,790	$49,509,300	$66,004,090
Alaska	22,074,816	14,815,807	151,740	37,042,363	-	37,042,363
Arizona	6,762,658	4,397,233	1,727,732	12,887,623	33,606,600	46,494,223
Arkansas	5,639,442	4,528,253	1,259,326	11,427,021	25,050,900	36,477,921
California	22,247,521	10,532,114	25,004,182	57,783,817	228,847,200	286,631,017
Colorado	7,293,440	4,737,764	2,353,025	14,384,229	31,734,300	46,118,529
Connecticut	2,901,563	1,578,988	5,195,280	9,675,831	33,796,200	43,472,031
Delaware	2,055,234	1,370,156	530,571	3,955,961	8,911,200	12,867,161
Florida	8,015,276	4,987,594	5,588,630	18,586,500	49,651,500	68,238,000
Georgia	10,095,166	7,635,512	3,741,469	21,472,147	44,105,700	65,577,847
Hawaii	2,055,234	1,370,156	857,833	4,283,223	18,794,100	23,077,323
Idaho	4,630,210	3,326,774	482,138	8,439,122	11,233,800	19,672,922
Illinois	15,425,095	8,426,519	14,849,013	38,700,627	124,851,600	163,552,227
Indiana	9,222,532	6,678,936	5,185,909	21,087,377	59,273,700	80,361,077
Iowa	9,205,326	6,867,214	2,470,622	18,543,162	30,288,600	48,831,762
Kansas	9,139,087	6,387,530	2,267,788	17,794,405	18,557,100	36,351,505
Kentucky	6,469,942	5,539,143	2,307,267	14,316,352	48,822,000	63,138,352
Louisiana	6,095,886	4,389,890	3,617,533	14,103,309	69,132,900	83,236,209
Maine	2,947,462	2,249,416	784,294	5,981,172	11,304,900	17,286,072
Maryland	4,054,921	2,545,834	4,179,079	10,779,834	43,845,000	54,624,834
Massachusetts	5,424,274	2,448,943	7,964,678	15,837,895	51,286,800	67,124,695
Michigan	12,424,754	7,787,801	10,481,080	30,693,635	93,259,500	123,953,135
Minnesota	10,470,296	7,379,201	3,788,945	21,638,442	61,904,400	83,542,842
Mississippi	6,103,698	5,189,113	1,357,320	12,650,131	29,079,900	41,730,031
Missouri	11,126,223	7,614,648	5,135,818	23,876,689	61,217,100	85,093,789
Montana	7,749,693	5,372,553	529,083	13,651,329	22,396,500	36,047,829
Nebraska	7,589,682	5,402,939	1,332,764	14,325,385	13,983,000	28,308,385
Nevada	4,810,272	3,199,450	348,676	8,358,398	12,063,300	20,421,698
New Hampshire	2,055,234	1,370,156	611,348	4,036,738	10,736,100	14,772,838
New Jersey	6,127,534	2,180,663	9,959,813	18,268,010	62,402,100	80,670,110
New Mexico	7,011,801	4,725,276	1,117,302	12,854,379	23,889,600	36,743,979
New York	18,463,335	7,976,787	26,618,842	53,058,964	113,404,500	166,463,464
North Carolina	9,645,417	8,637,024	3,031,520	21,313,961	19,576,200	40,890,161
North Dakota	4,875,745	3,598,981	406,015	8,880,741	10,570,200	19,450,941
Ohio	14,126,600	8,789,002	13,073,033	35,988,635	163,340,400	199,329,035
Oklahoma	8,350,762	5,816,547	2,549,398	16,710,707	28,795,500	45,506,207
Oregon	6,436,149	4,496,007	1,930,963	12,863,119	41,569,800	54,432,919
Pennsylvania	15,331,618	9,833,029	14,709,478	39,874,125	107,052,900	146,927,025
Rhode Island	2,055,234	1,370,156	1,372,194	4,797,584	8,816,400	13,613,984
South Carolina	5,235,203	4,580,619	1,655,210	11,471,032	20,666,400	32,137,432
South Dakota	5,566,459	4,040,903	420,192	10,027,554	15,713,100	25,740,654
Tennessee	7,731,611	6,146,134	3,292,200	17,169,945	60,316,500	77,486,445
Texas	24,635,880	15,549,197	12,849,266	53,034,343	108,285,300	161,319,643
Utah	5,116,907	3,329,356	1,205,581	9,651,844	34,649,400	44,301,244
Vermont	2,055,234	1,370,156	321,261	3,746,651	16,518,900	20,265,551
Virginia	7,774,678	6,073,963	4,006,905	17,855,546	72,735,300	90,590,846
Washington	6,664,284	4,512,251	3,446,145	14,622,680	49,888,500	64,511,180
West Virginia	3,919,460	3,554,157	1,216,366	8,689,983	36,024,000	44,713,983
Wisconsin	9,109,799	6,431,738	4,471,619	20,013,156	21,164,100	41,177,256
Wyoming	5,022,560	3,412,437	272,701	8,707,698	22,965,300	31,672,998
Dist. of Col.	2,055,234	1,370,156	1,450,816	4,876,206	34,412,400	39,288,606
Puerto Rico	2,080,925	2,299,811	1,772,394	6,153,130		6,153,130

NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS



INTERSTATE AND DEFENSE HIGHWAY SYSTEM IN MASSACHUSETTS

90-10 PROGRAM



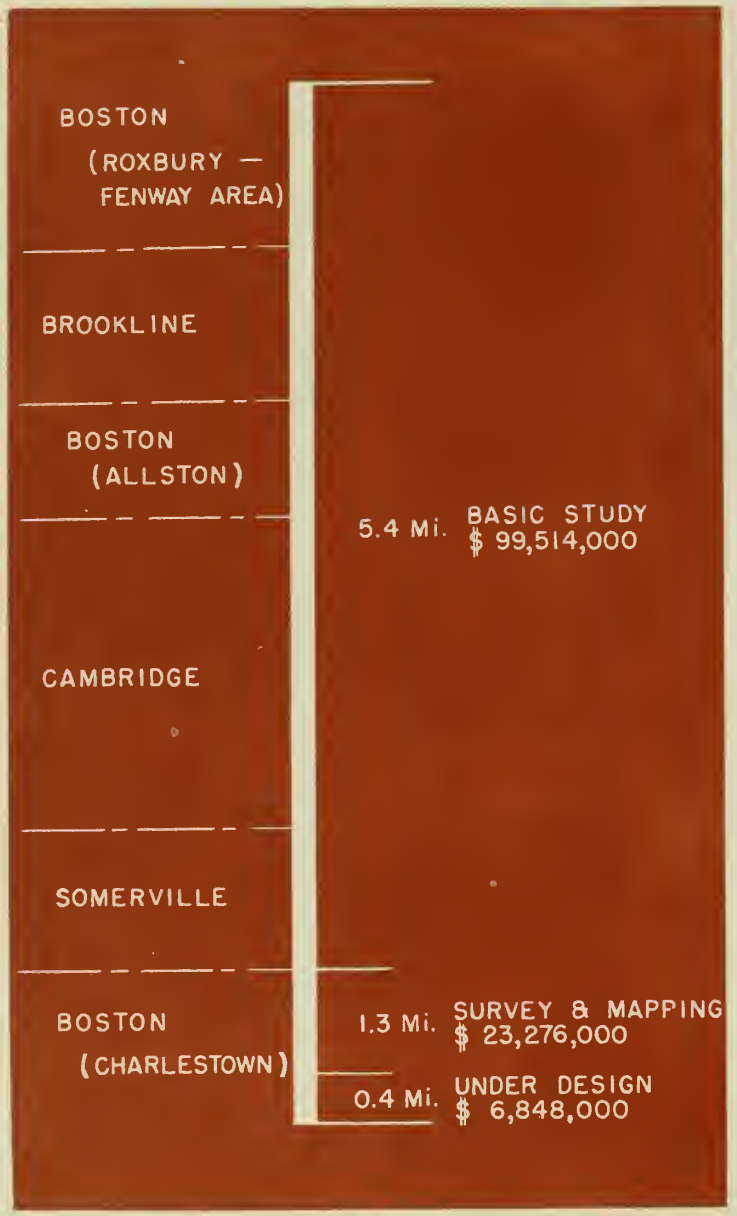
I-84 —— 8.0 miles - all in use*
I-90 —— 131.4 miles - 123.3 miles in use
I-91 —— 54.8 miles - 10.9 miles in use - 11.1 miles under construction
I-93 —— 26.2 miles - 23.6 miles in use - 0.8 mile under construction
I-95 —— 78.2 miles - 30.3 miles in use* - 9.3 miles under construction
I-195 —— 25.8 miles - 7.8 miles in use - 4.2 miles under construction
I-290 —— 19.9 miles - 2.0 miles in use - 0.9 mile under construction
I-291 —— 5.2 miles - 1.4 miles in use
I-295 —— 4.0 miles
I-495 —— 87.3 miles - 8.0 miles completed - 14 miles under construction
I-695 —— 7.1 miles

Estimate of cost to complete balance of Interstate System as of October 1, 1961 - $665,289,000.

*Additional work necessary to conform to Interstate standards on 6.8 miles of I-84 and 20.4 miles of I-95.

METROPOLITAN BOSTON'S INNER BELT . . .

interstate route 695



what the inner belt will mean

The Inner Belt has been called the single, most important highway in the network of expressways in Metropolitan Boston.

The Belt Expressway was originally proposed in the Master Highway Plan of 1948. The concept of this plan is based on a system of radial expressways leading into the heart of the metropolitan Boston area from the suburbs and terminating at an inner belt expressway which functions as an interconnector between the radials and as a collector-distributor for that traffic having its origin and destination within or close to the core city.

As the radials fan out from the core they will be connected by a concentric series of belts--namely, the Inner Belt, Route 128 and Interstate Route 495 (the Outer Belt) and, eventually, I-495's southeasterly extension.

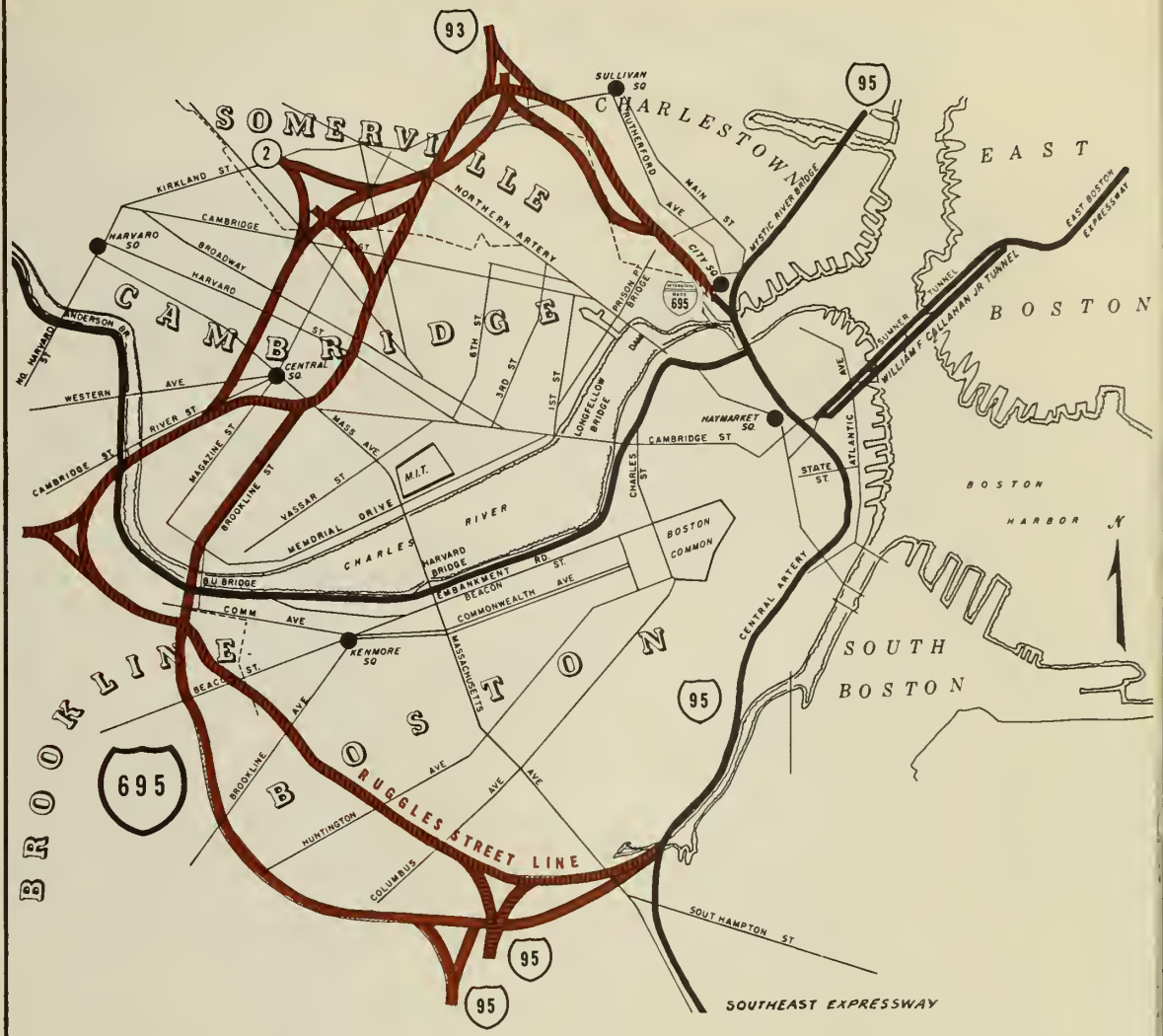
The Inner Belt and radials must accommodate expected traffic volumes for 1975. The success of the system of expressways leading into Boston from points north, west and south, depends in great measure on the building of the Inner Belt. If the radials are likened to the spokes of a wheel it is obvious that the Inner Belt is the wheel's hub.

A major step in planning for the Inner Belt was taken in 1961 by the Department of Public Works which submitted corridor route plans for two important segments of the Belt Route to the U.S. Bureau of Public Roads for approval.

Inner Belt segments chosen by the Department from alternates were the Ruggles Street line in the Roxbury and Fens section of Boston and the section in Charlestown traversing the Boston & Maine Railroad yards.

The Ruggles Street line, including a section of I-95, extends from the junction of the present Central Artery at Southampton Street and Massachusetts Avenue to a point on Beacon Street near the Boston-Brookline line. The Charlestown segment extends from Prison Point Bridge in Charlestown to a point on the Somerville-Boston line in the vicinity of Cambridge Street, Charlestown. A short section from the end of the present Central Artery at City Square to Prison Point Bridge through the Boston & Maine Railroad yards had previously received Federal approval for survey purposes only.

The Ruggles Street segment is 12,000 feet long and the Charlestown segment is 4800 feet long. Still pending is the approval by the Bureau of Public Roads for the Ruggles Street line.



Inner Belt alternate routes presented at public hearing

community benefits to be derived from the inner belt

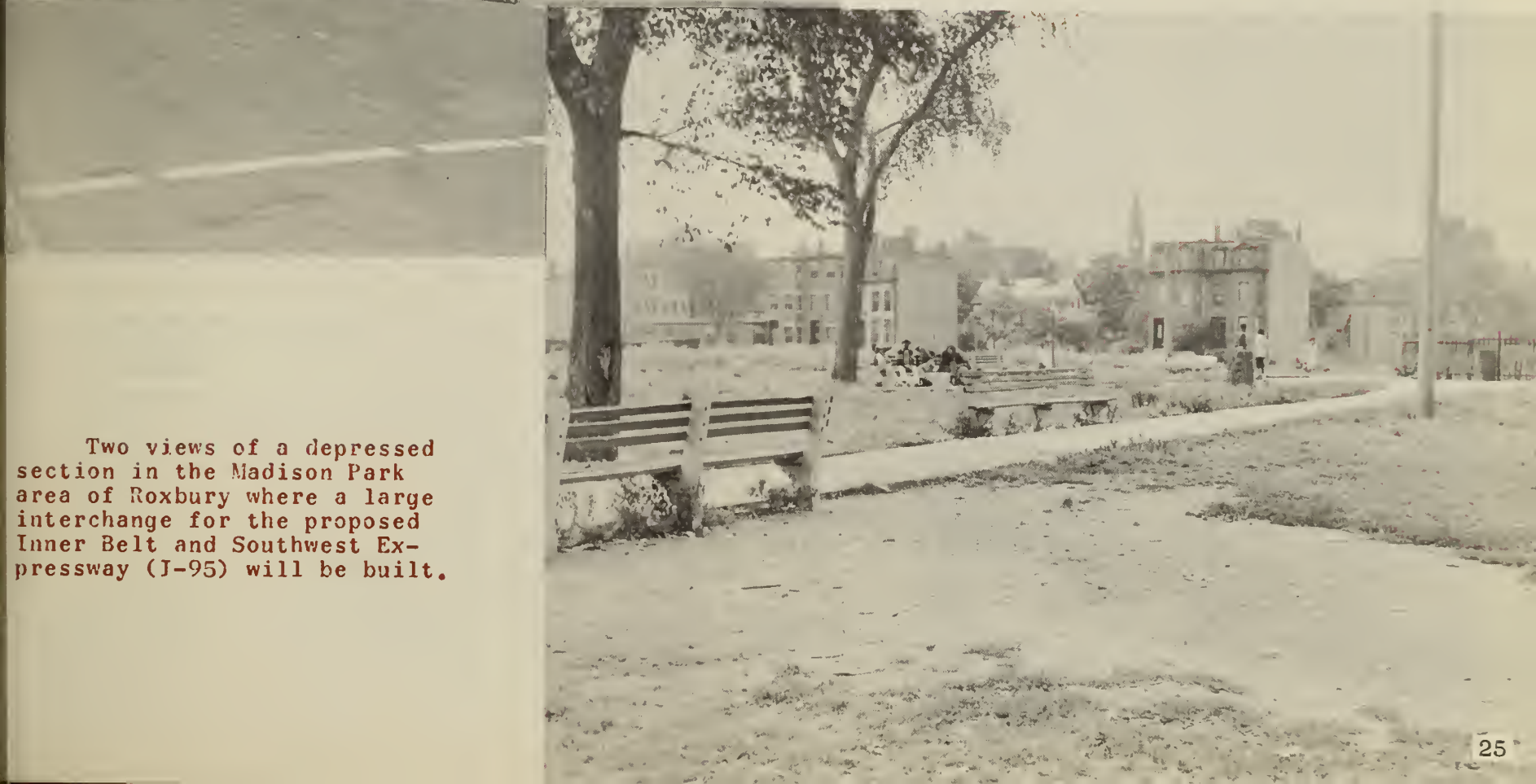
The Inner Belt will prove a great boon to the communities through which it will run.

Among benefits it will bring are: elimination of through traffic on local streets including heavy truck traffic; encouragement of development along the route; provision for easier intercity travel in metropolitan Boston for both commercial and pleasure vehicular traffic; and a close relationship with urban renewal and redevelopment of the communities.

On this latter point, the Ruggles Street line will have an interchange with I-95 (Southwestern Expressway) in the Madison Park area where the City of Boston has demolished considerable substandard property under its urban renewal program. Though the Belt Route in Cambridge is yet to be resolved, the lines presented at the public hearing would separate the industrial area of East Cambridge from the residential section of Cambridge, thus benefitting both industrial growth and residential development.

Substantial benefits should accrue to all communities along the Inner Belt's path in terms of increased land values. An economic renaissance may very well be the greatest benefit derived.

Construction of the Inner Belt and the system of radials will enable city planners to better plan for their communities' future growth.



Two views of a depressed section in the Madison Park area of Roxbury where a large interchange for the proposed Inner Belt and Southwest Expressway (J-95) will be built.

THE OUTER BELT

INTERSTATE 495

I-495, termed the Outer Belt, received its baptism on September 29, 1961 when the first six miles of this circumferential expressway were opened to traffic in Chelmsford and Westford.

The first segment to open extended from Route 3 at Chelmsford, southwesterly to Boston Road in Westford. Another six miles of highway southwesterly to Route 2, in Littleton is expected to be opened in the late Fall. Thus traffic service will be established between principal Routes 2 and 3.

Stretching in an 88-mile arc, from Salisbury on the north to Mansfield on the south, and located between 11 and 17 miles outside the Route 128 circumferential highway, I-495 holds great promise for the 30 communities which it touches along its path.

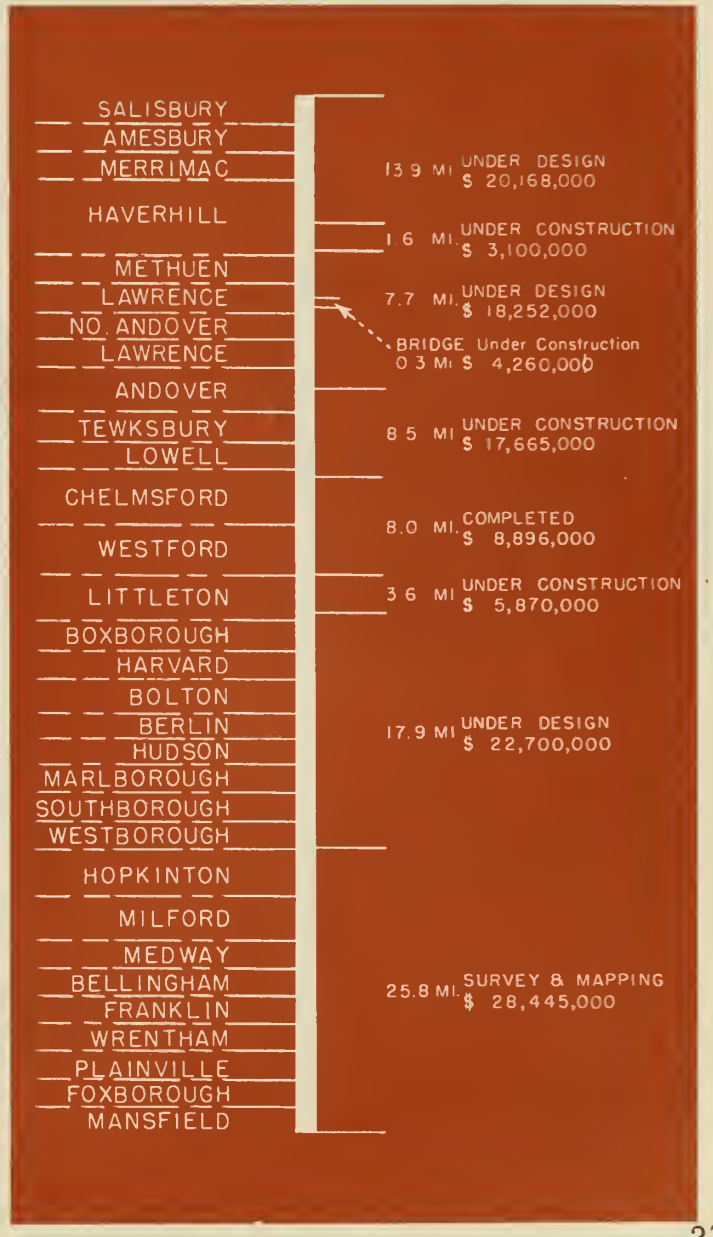
The Department has completed, or under construction, some $41,000,000 worth of work on this highway, most of it concentrated in the Merrimack Valley region where I-495 is counted on to be of tremendous help in aiding the economic revival of the metropolitan areas of Lowell, Lawrence and Haverhill.

Construction was underway in 1961 in nine communities -- Littleton, Westford, Chelmsford, Lowell, Tewksbury, Andover, North Andover, Lawrence and Haverhill.

Unusual photo of double-deck bridge over Merrimack between Lawrence-No. Andover

I-495 will fill a need for a major highway running in the northeasterly section of the state connecting the cities and towns of the Merrimack Valley to Worcester and express highways leading to New York and other metropolitan centers along the Atlantic Seaboard and to the west. On its northern extremity, the Outer Belt will tie in with express highways to New Hampshire and Maine.

Because of the need for relieving the heavy intercity traffic which was clogging outmoded Routes 110 and 125 and the desire to alleviate the chronic economic distress which has plagued the area, it was decided to give priority to work on the Outer Belt in the Merrimack Valley.

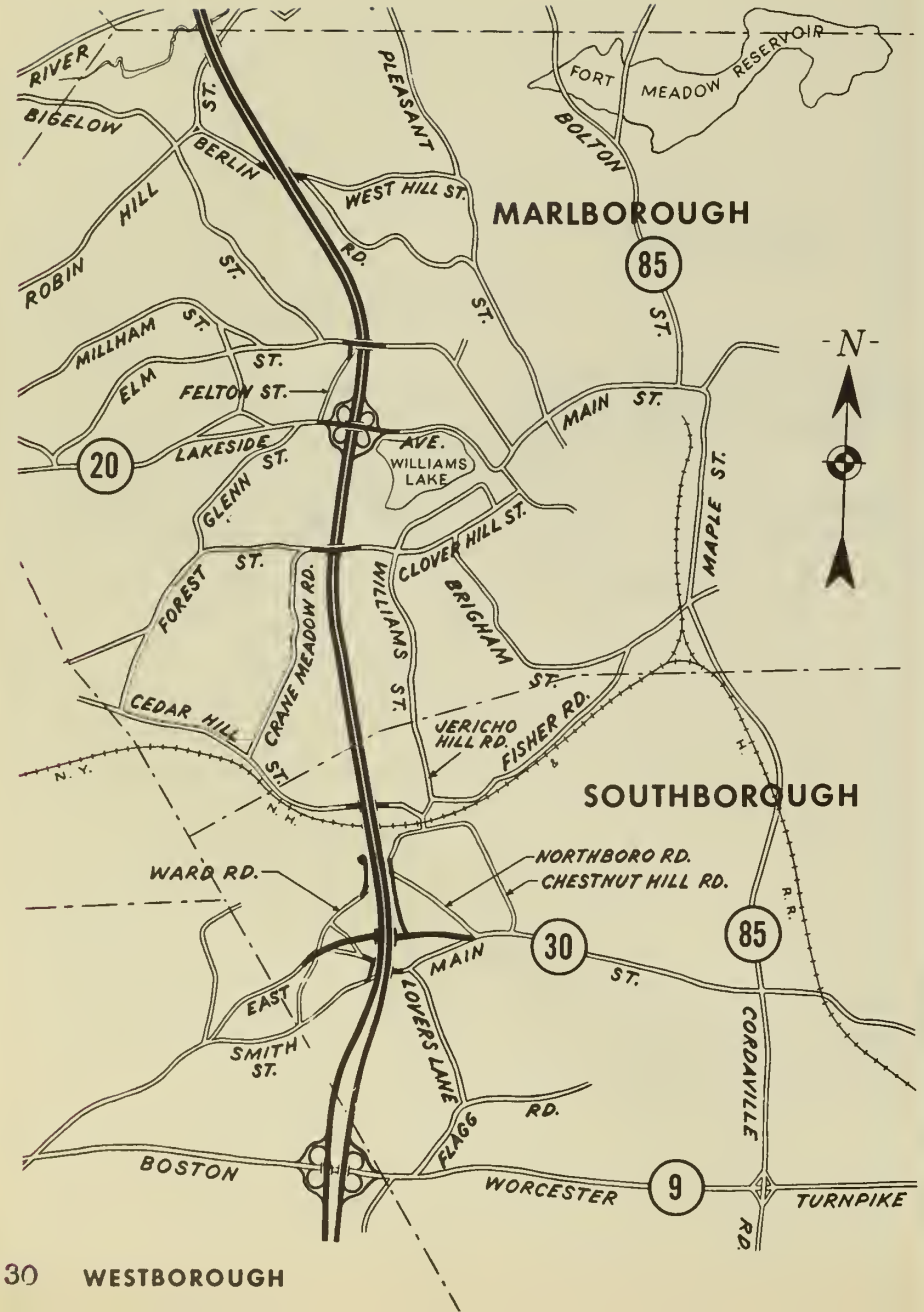


INTERSTATE ROUTE 495

The Outer Belt, from Harvard to Methuen, showing interchanges with other important highways and local access roads.

This map shows how I-495 will bind together the industrial communities of the Merrimack Valley. Note how it will replace old Route 110 as a through highway.

WESTERN PORTION OF I-495



Marlboro, Southboro, and Westboro

In the early summer of 1962, construction is expected to start in the western part of the Outer Belt, from an interchange with Route 9, in Westborough, northerly through Southborough to an interchange with Route 20 in Marlborough.

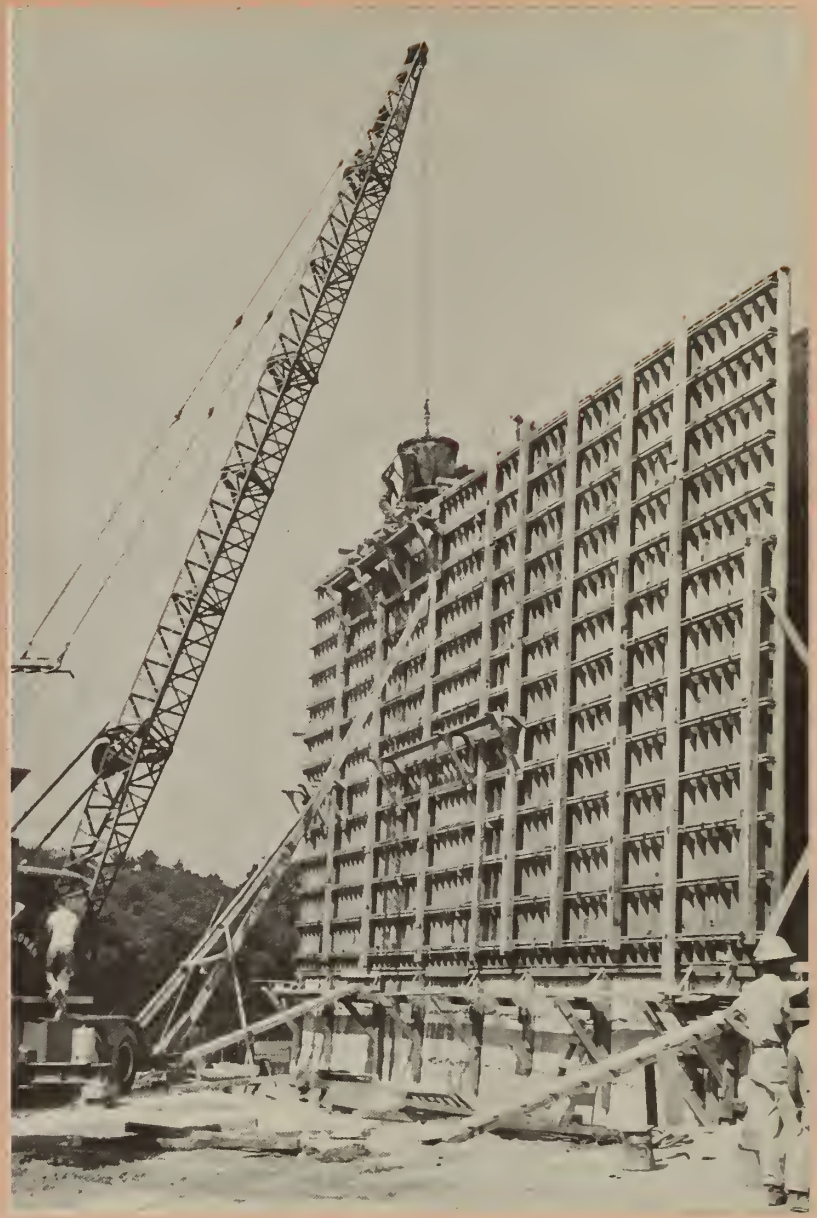
Thus, two of the Commonwealth's major east-west routes will be linked by an important circumferential highway of the future. This will be a 3.7 mile segment of I-495.

The southeastern arc of I-495, will connect by modern highways communities of this area, with Springfield and other Western Massachusetts cities, Worcester and the New York routes. It will also provide easy access to the Southeastern Massachusetts population centers of New Bedford and Fall River and Cape Cod as well as Providence, Rhode Island.

About 14 miles of the Outer Belt are currently under construction and 8 miles have been completed, of which 6 miles have been opened to traffic.

I-495 through Chelmsford. In foreground is Westford Rd. Route 4 (North Rd.) top.

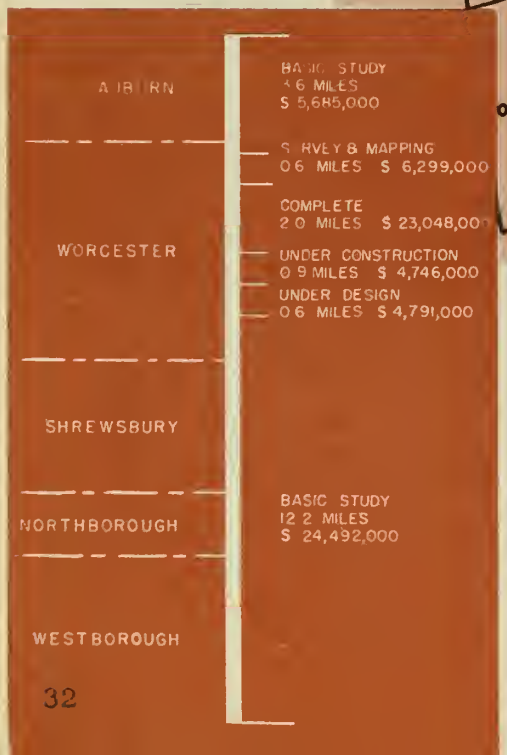
East Bridge, Haverhill to carry I-495 (Outer Belt) traffic over Merrimack.



Placing concrete for a pier at the East Bridge which will span the Merrimack in Haverhill.

THE WORCESTER EXPRESSWAY . . .

interstate route 290



Substantial progress was made in the past year in the further development of the Worcester Expressway, designated Interstate Route 290.

Another mile of the Expressway was opened on August 18, 1961 from Harrison Street, south to Brosnihan Square, thus making a total of two miles of downtown Expressway open to motorists.

A public hearing was held on July 25, 1961 at which time the Department presented plans for extension of I-290 from Brosnihan Square southwesterly for approximately five miles to a connection with the Massachusetts Turnpike at Route 12 in Auburn.

One location would carry the Expressway through Fitton Field, with its football and baseball facilities, on the campus of the College of the Holy Cross. In Auburn, the basic line will go through the Auburn Industrial Park.

Map shows alternate lines presented at public hearing.

a new artery for worcester and its suburbs

Interstate Route 290 represents a vital artery connecting Worcester and its suburbs with the major urban centers of the Northeast. Its completion along with other integral parts of the Interstate System will mean fast, easy access between the Worcester area and the Boston, Providence and New York metropolitan areas.

The new highway will bring immeasurable benefits to commercial and industrial interests using truck transport, by providing direct tie-ins with the Massachusetts Turnpike in Auburn and the proposed Interstate Route 495 to the east.

Construction of I-290 will bring needed relief to commuter and pleasure traffic by saving on driving time and reducing downtown congestion through elimination of much through traffic from the business district. Specifically, it will relieve pressure from existing Route 12, the north-south road through Worcester and Auburn.

Massachusetts' second largest city, with over 200,000 population, will be well served by this important Interstate highway. Besides providing closer links to major market areas, it will tend to bring closer together in both social and economic terms, the communities of Marlborough, Westborough, Northborough, Shrewsbury and Auburn, with Worcester, all of which share the Expressway route with the central city.

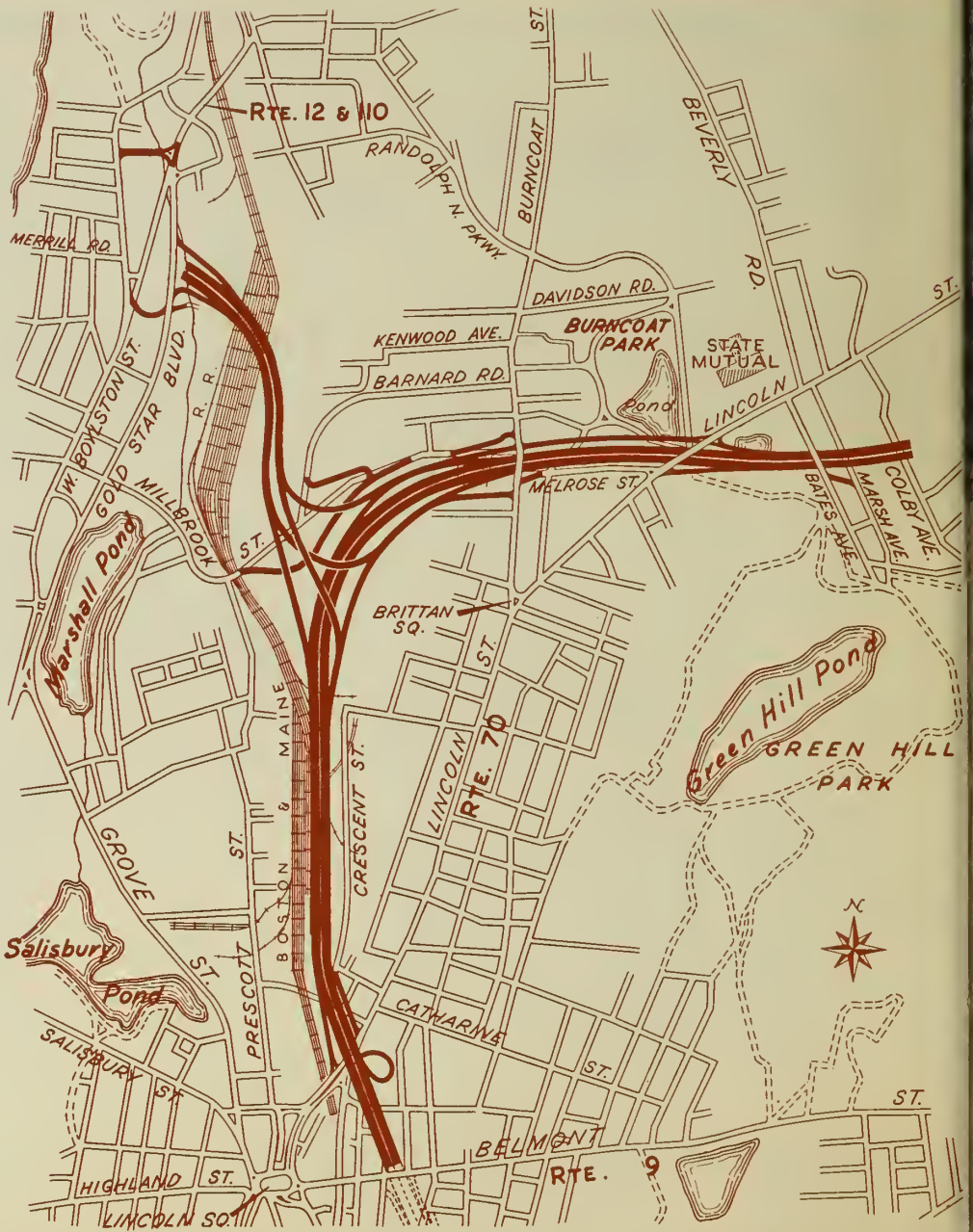
THE IMPACT OF INTERSTATE 290 ON WORCESTER

Construction started in the Fall of 1961 on another section of I-290 to the north extending .9 of a mile from the end of present construction north of Belmont Street to the Boston & Maine Railroad spur. A further section, from the railroad spur to Burncoat Street, a distance of .6 of a mile will be advertised this Fall. This latter project will also include a half-mile urban expressway to a connection with Gold Star Boulevard.

Road tests reveal what a great timesaver the Worcester Expressway is for the motorist.

The trip over the two miles of completed Expressway can be made in approximately two minutes, in either direction. Traveling on the local roads paralleling I-290 takes from 5½ to 7 minutes, depending, of course, on specific traffic conditions. With the use of the new Expressway, considerable traffic has been taken off the surface streets. The trip on the local streets would have taken 10-15 minutes before building of I-290. Tests were conducted during peak traffic hours of 8-9 a.m. and 4-5 p.m.

The Worcester Expressway (I-290), north of Belmont Street, as proposed, will parallel the railroad to a point where a link with proposed Route 12 and Gold Star Boulevard can be made. From this junction, I-290 swings easterly. Construction on this section started in late 1961.

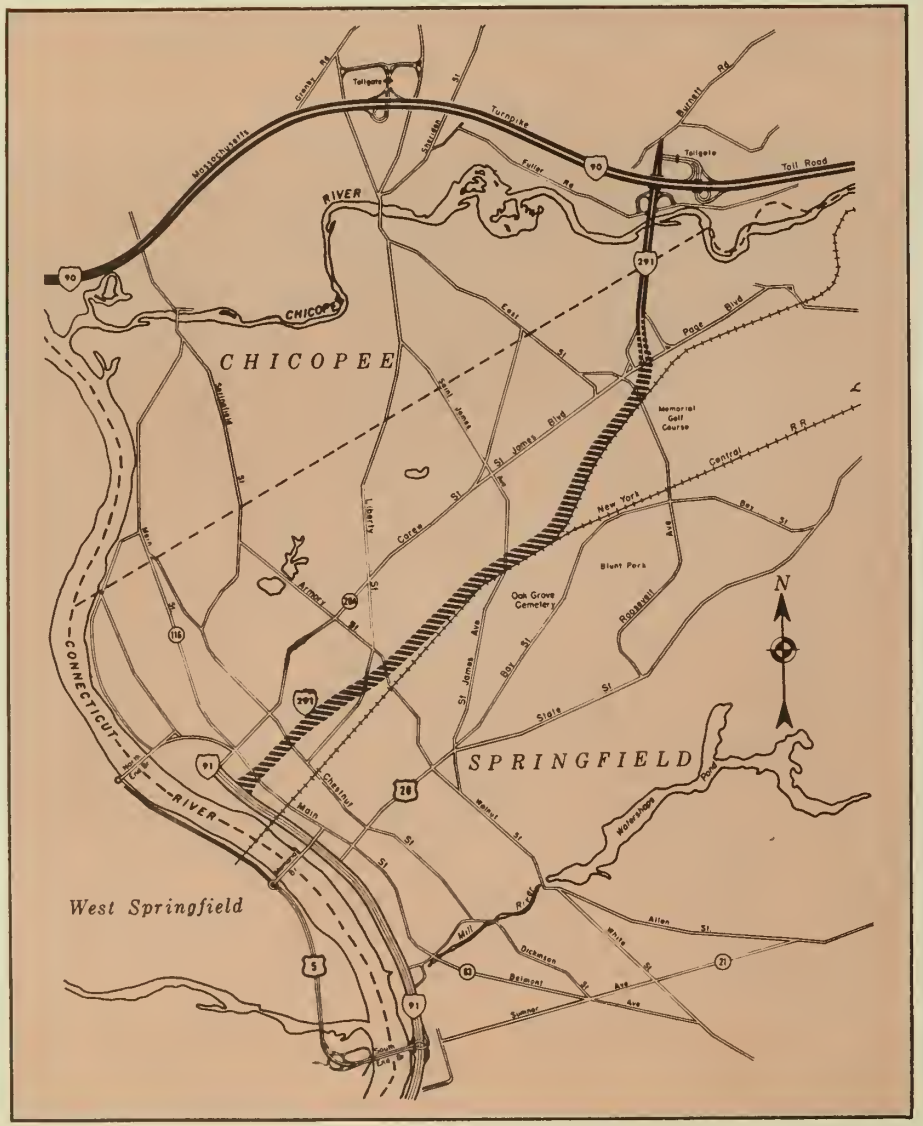


Worcester Expressway looking northerly toward the overpasses at Vernon Street and Kelley Square and Harrison Street above. This mile of I-290, south from Posner Square, was opened to traffic on August 15, 1961. Also shown is the service provided for local traffic.

The Worcester Expressway (I-290) looking northerly from Brosnihan Square. Shown in the foreground is the end of present construction and a temporary connecting loop to Quinsigamond Avenue.

SPRINGFIELD AT NEW CROSSROADS

interstate routes 90, 91, and 291 to bring changes

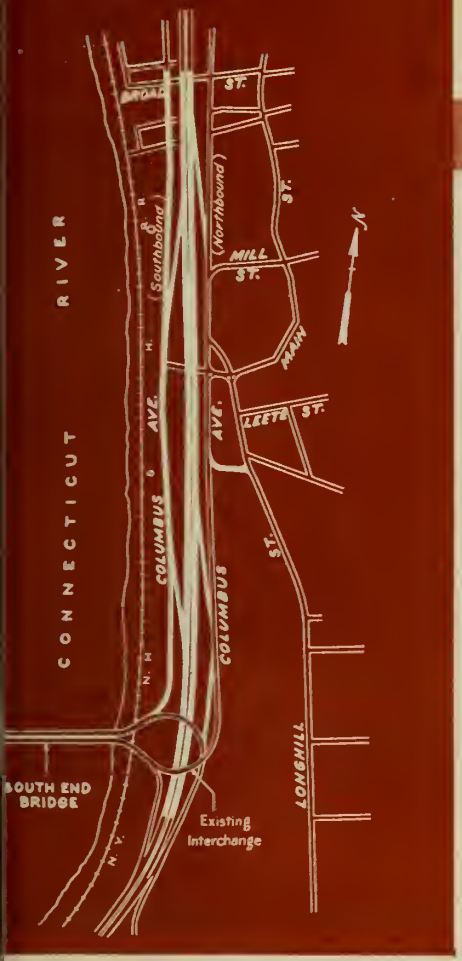


Situated on the Connecticut River, in an almost direct north-south line with Hartford and New York City, Springfield has occupied for three centuries a pivotal position in the trade and commerce of Western New England.

Promising to make Greater Springfield an even more significant center commercially is the happy fact that it will be at the crossroads of two important highways in the Interstate System -- I-90 which is the Massachusetts Turnpike and I-91, the north-south highway following the Connecticut River. In addition, the City of Springfield will benefit greatly with the binding of these two major expressways together through the loop expressway, I-291.

I-91 in Springfield, running between Columbus Avenue and the New Haven Railroad, will be west of and adjacent to the downtown business center.

I-291 will be located just north of the main business district and will run generally in a northeast-southwesterly direction to link with the Massachusetts Turnpike in Chicopee. A 1.4 mile section of I-291 off the Turnpike has already been completed to Page Boulevard and is in use.

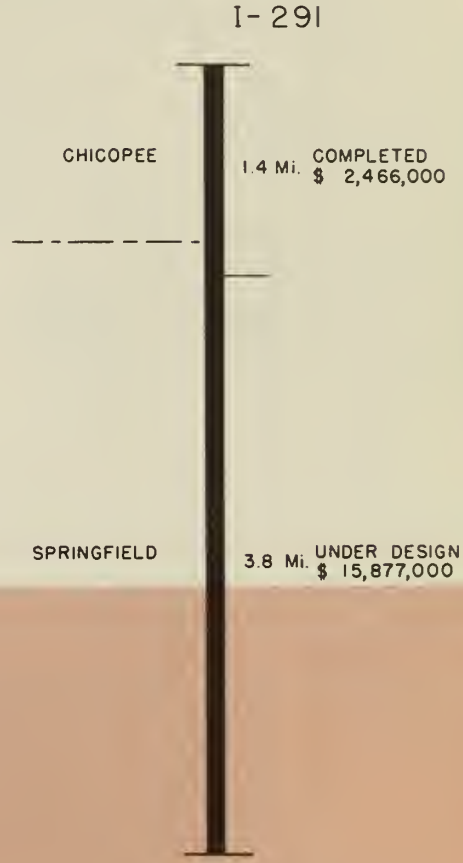


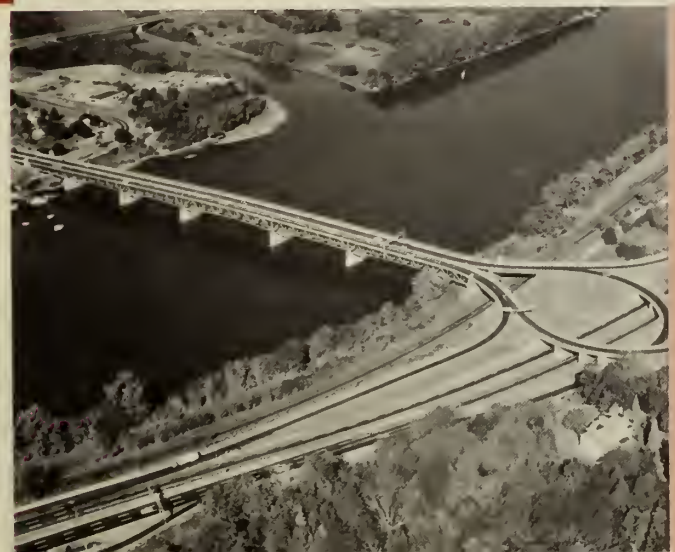
express highways to transform springfield

Construction started in the fall of 1961 on .79 of a mile of I-91 from the end of present construction at the South End Bridge to Broad Street.

This job, costing in excess of $2,186,000 is due for completion in two years. There will be six travel lanes plus shoulders with service roads on each side.

The grade of the new highway will be generally elevated above the existing road from the South End Bridge to State Street and will be constructed on earth embankment. At the South End Bridge, the Department will maintain most of the present interchange but the grade of existing roadways will be lowered to provide a 16-foot, six-inch clearance beneath the bridge to satisfy the U. S. Army's requirements for missile cariers.





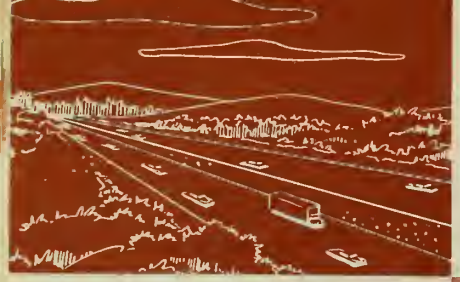
South End Bridge and I-91 at Springfield. Construction underway north to Broad St.

COLUMBUS AVE. IMPROVEMENT
SPRINGFIELD

I-91 approaching Springfield, showing connection to old Route 5 to Longmeadow.

Artist's sketch of I-91 along Columbus Avenue.

Another aerial of I-91 following Connecticut River in approach to Springfield from Longmeadow.



FROM BORDER TO BORDER WITH

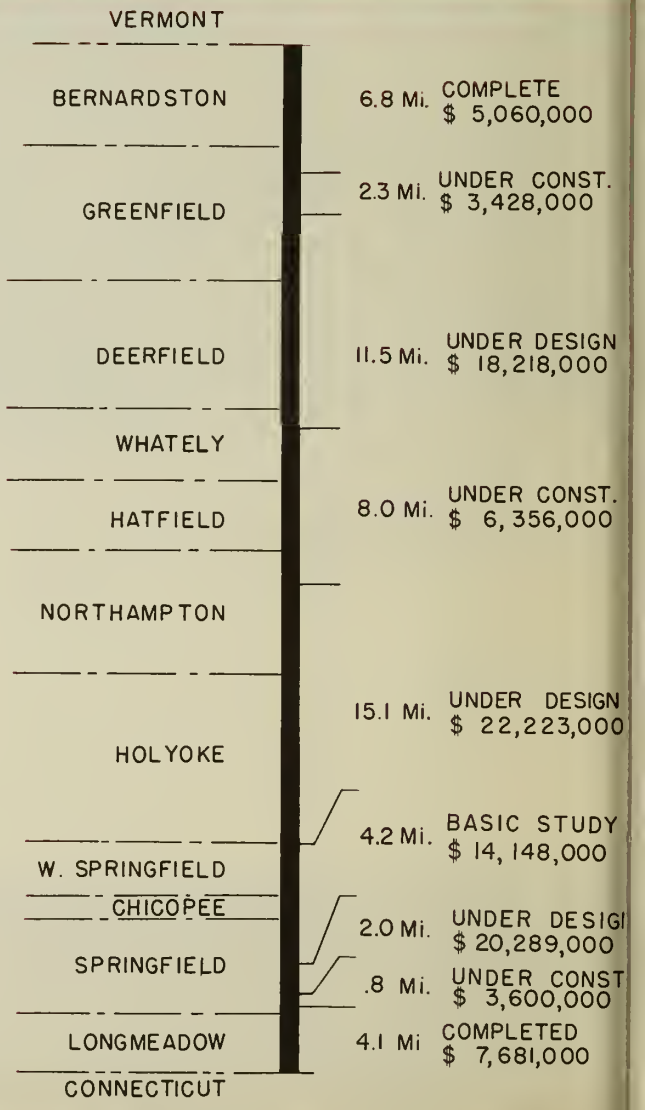
following the connecticut river valley from vermont to connecticut

When completed, Interstate Route 91 will be one of the most scenic Interstate highways in Massachusetts. It will be an attractive tourist highway, connecting by modern expressway the New York and Hartford areas with Western Massachusetts, Vermont and the Province of Quebec, Canada.

It will also prove to be a major factor in industrial growth in Western Massachusetts since it will be the major intercity highway link between Springfield, Chicopee, Holyoke, Northampton, Easthampton and Greenfield.

Residents of these municipalities and surrounding towns stand to benefit substantially in terms of traffic relief as through traffic leaves old Routes 5 and 10 to local travelers.

Another interesting aspect to I-91 will be its role in linking together the institutions of higher learning in the Valley, including Amherst College, the University of Massachusetts in Amherst, Mount Holyoke College in South Hadley, Smith College in Northampton; Springfield and American International in Springfield, the College of Our Lady of the Elms in Chicopee; as well as other institutions such as Deerfield Academy.



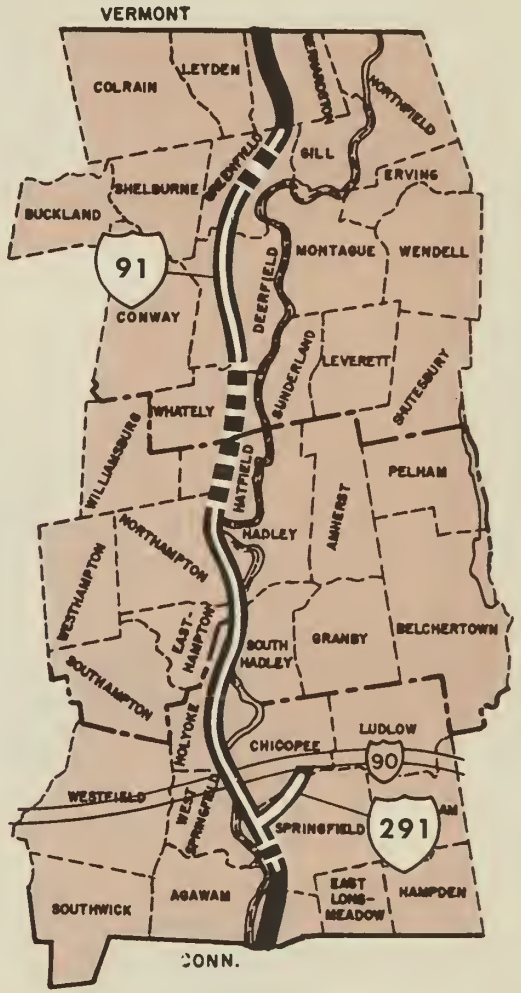
INTERSTATE 91

Greenfield will be the scene of much activity as construction on a major segment of I-91 progresses over the next two years.

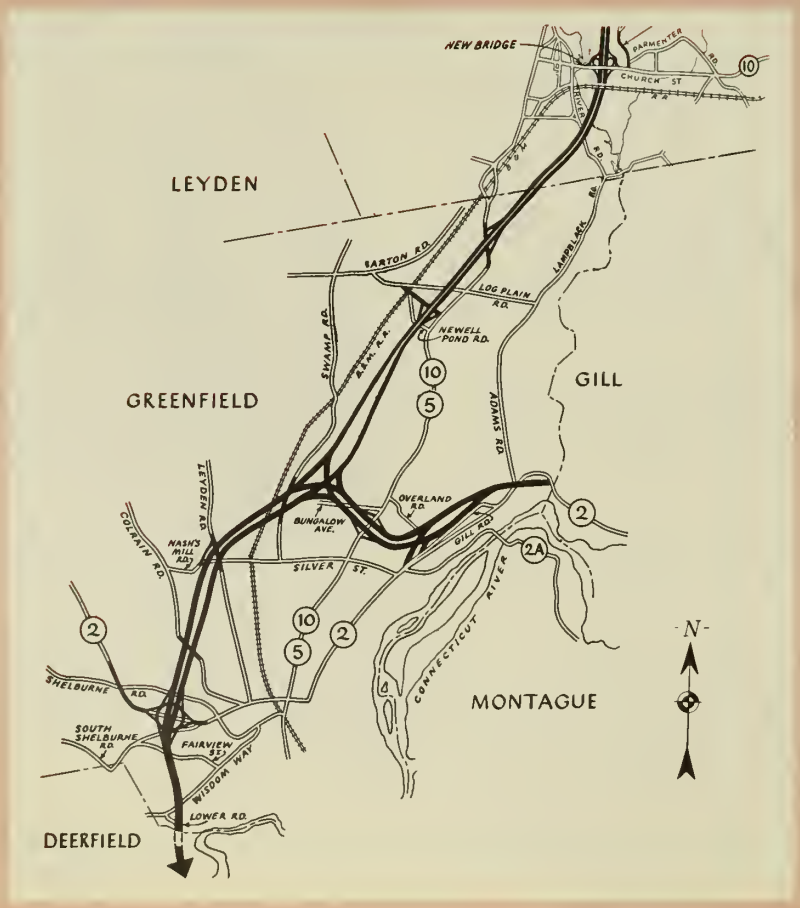
This construction was begun in the Fall of 1961, extending from the end of existing new highway at the Bernardston-Greenfield line southwesterly three miles to the vicinity of Country Club Road (Swamp Road). The new highway will parallel the Boston & Maine Railroad.

In connection with the construction of I-91, a section of Route 2 will be constructed from a point on I-91 just north of Bungalow Avenue to the present Route 2 in the vicinity of Gill Road.

A diamond-shaped interchange will be constructed at the crossing of the new Route 2 and Routes 5 and 10 (Bernardston Road.) This contract is for grading only since the fill must undergo a two-year consolidation period because of the clay conditions of the valley soil.



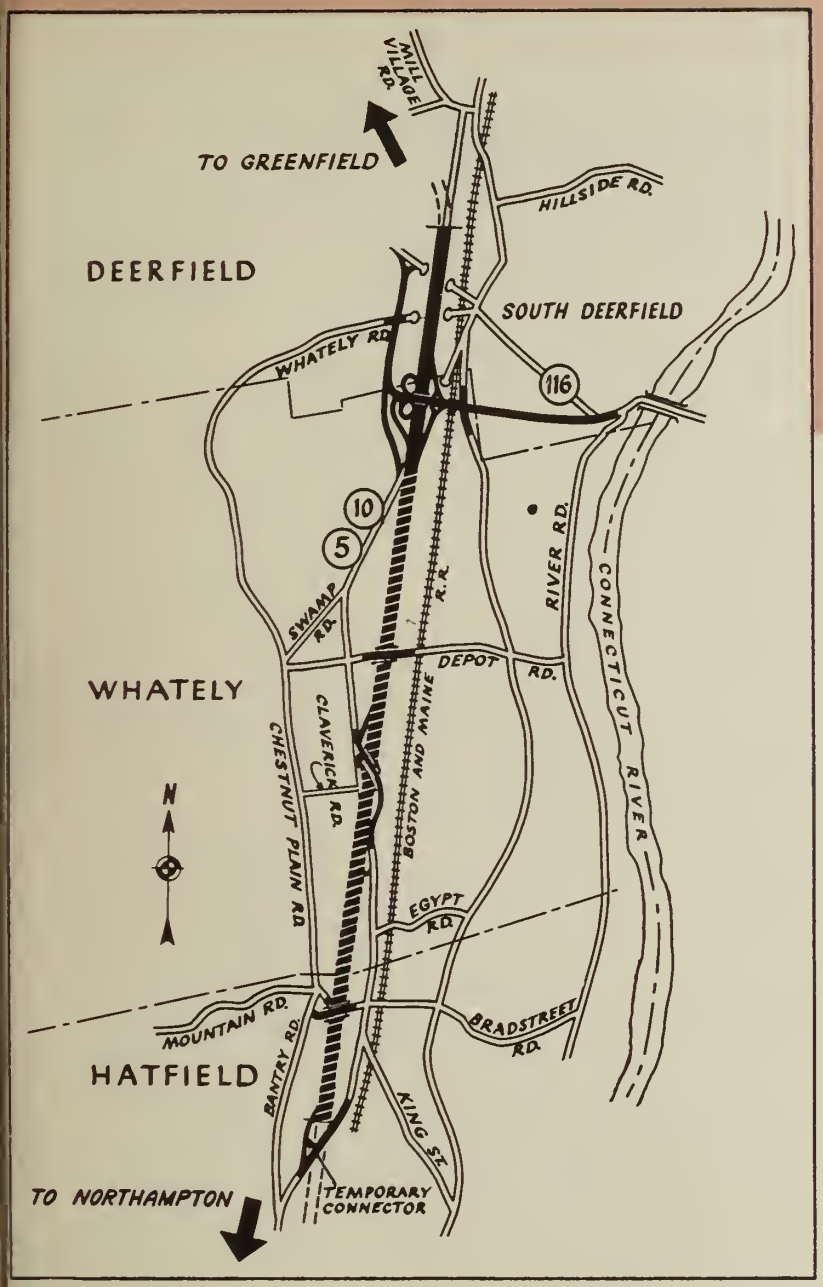
INTERSTATE ROUTE 91



Another three miles of I-91 southerly from the new Route 2 to existing Route 2, west of Greenfield Center, is scheduled to be advertised in the winter of 1961-62. A rotary will be constructed at this point, thus providing a Route 2 by-pass of Greenfield.

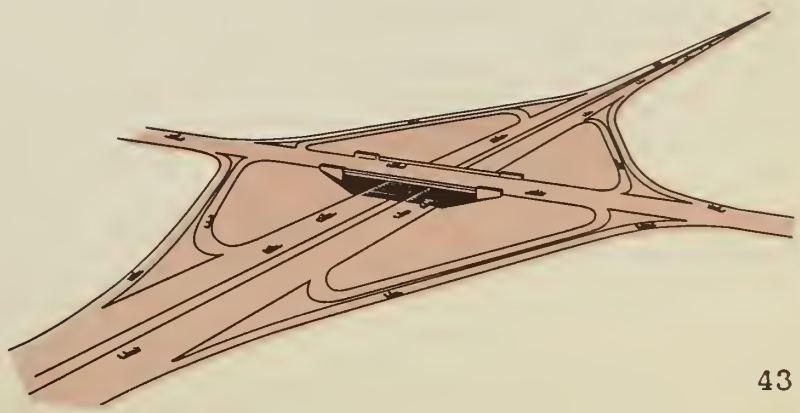
The first 4.5 miles of I-91 were opened from Bernardston at Route 10 to the Vermont line on June 24, 1960.

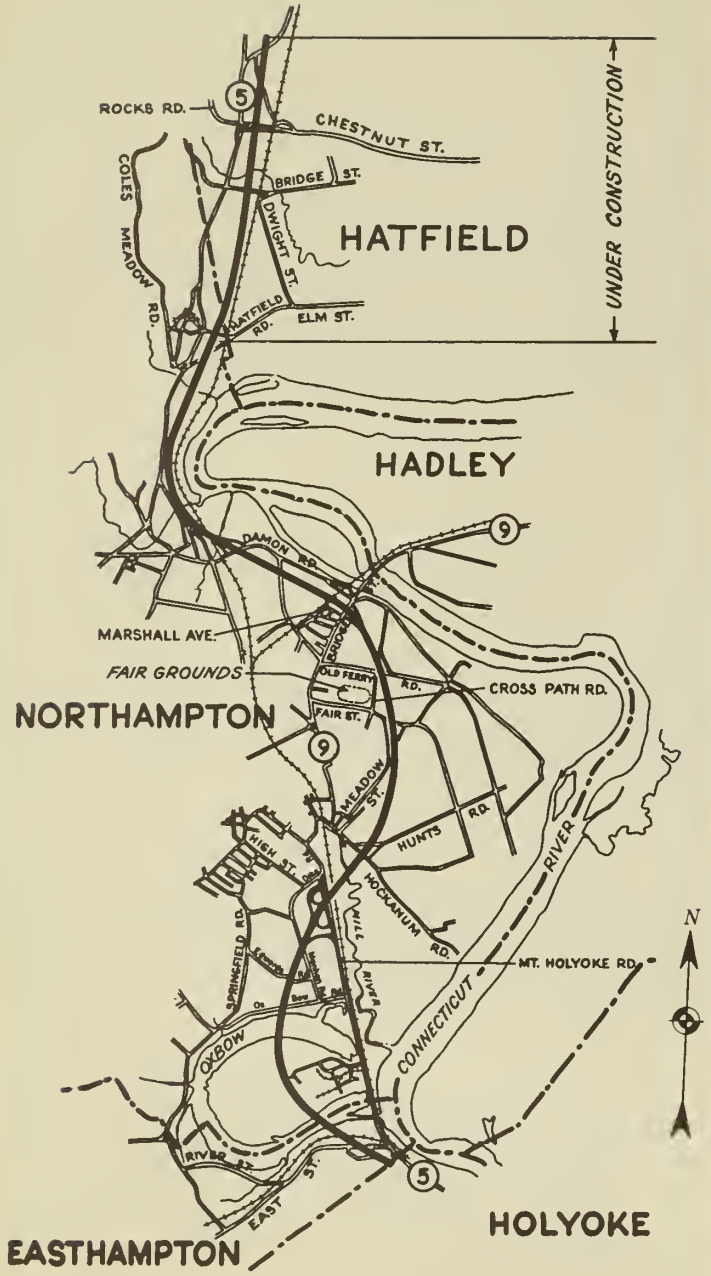
A second section, southerly into Greenfield for 2.3 miles, was opened on September 24, 1960.



The Whately-Hatfield section of I-91, shown in broken line here, was completed for grading only in late Fall, 1961.

Because of the nature of the soils foundation in the valley flood plain, a settling period must ensue here before paving can be accomplished. A paving contract will be let probably in the Summer of 1962 for this five-mile section.





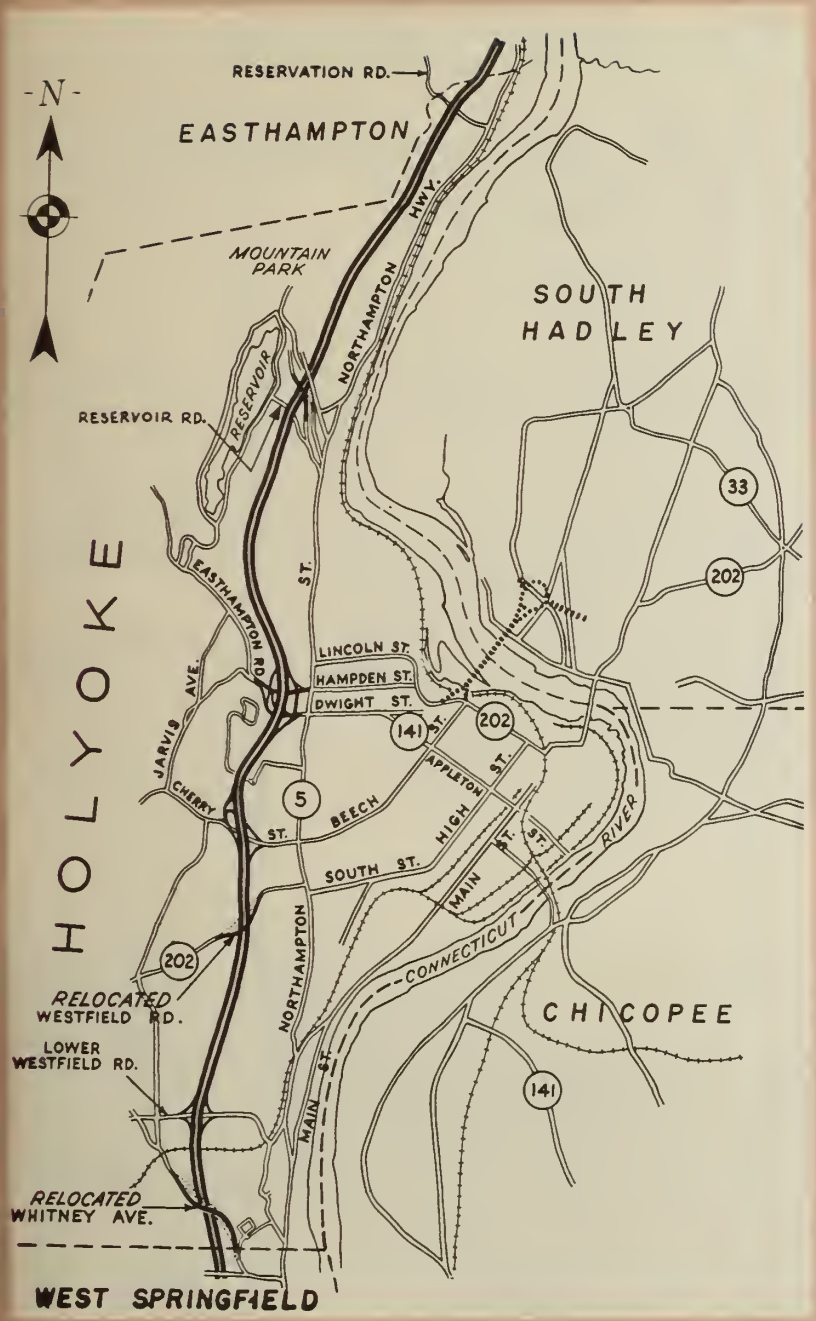
INTERSTATE ROUTE 91

This 3.1 mile, $1,100,000, section of I-91 through Hatfield and Northampton is in much the same shape as the segment just to the north, where clay soil conditions necessitate settlement of the fill.

Here again, surfacing will not be possible before the summer of 1962.

A final decision was made in 1961 on the route which I-91 will take through Holyoke. The route finally decided upon, proceeds west of the thickly settled residential portions of the city.

The 15.1 miles through Northampton, Easthampton, and Holyoke, will be built in three sections - extending southerly from Hatfield Road, Northampton, crossing the Ox Bow to existing Route 5 in the vicinity of Mount Tom Junction near the Easthampton line.



From there I-91 will extend southerly from Mount Tom to Reservoir Road, Holyoke, thence southerly from that point to Whitney Avenue, Holyoke.

Construction contracts are programmed for the 1963 and 1964 fiscal years. Due to the length and costly nature of the route, from the Ox Bow through hilly terrain in Easthampton and Holyoke, construction will extend over several years.

Right of way through this area will be filed in the 1962 fiscal year.

At present, the Department is investigating all locations including those suggested by local officials as a route for the remaining section of I-91 from the Holyoke-West Springfield line southerly to John Street in Springfield.

When these studies are completed, a public hearing will be scheduled at which results of the studies will be presented.

INTERSTATE ROUTE 93

bringing the merrimack valley to boston's doorstep

This important north-south Interstate highway is now open all the way from Roosevelt Circle in Medford to the New Hampshire line, a distance of 23 miles.

A section 2½ miles long from North Border Road, Stoneham to Roosevelt Circle was opened to July 4th traffic. Another 2½-mile section was opened from Route 110, Methuen to the New Hampshire line.

The northbound roadway of I-93 from Roosevelt Circle south for .8 of a mile to Salem Street in Medford Square was also opened in the Fall. Opening of the southbound roadway was delayed to avoid pouring heavy traffic into Medford Square, before it can be properly accommodated.

A view of scenic Interstate 93

NEW HAMPSHIRE

METHUEN

ANDOVER

TEWKSBURY
ANDOVER
TEWKSBURY

WILMINGTON

COMPLETED
23.6 MILES
$ 41,163,900

WOBURN
READING
STONEHAM
WOBURN
STONEHAM
WINCHESTER
STONEHAM

MEDFORD

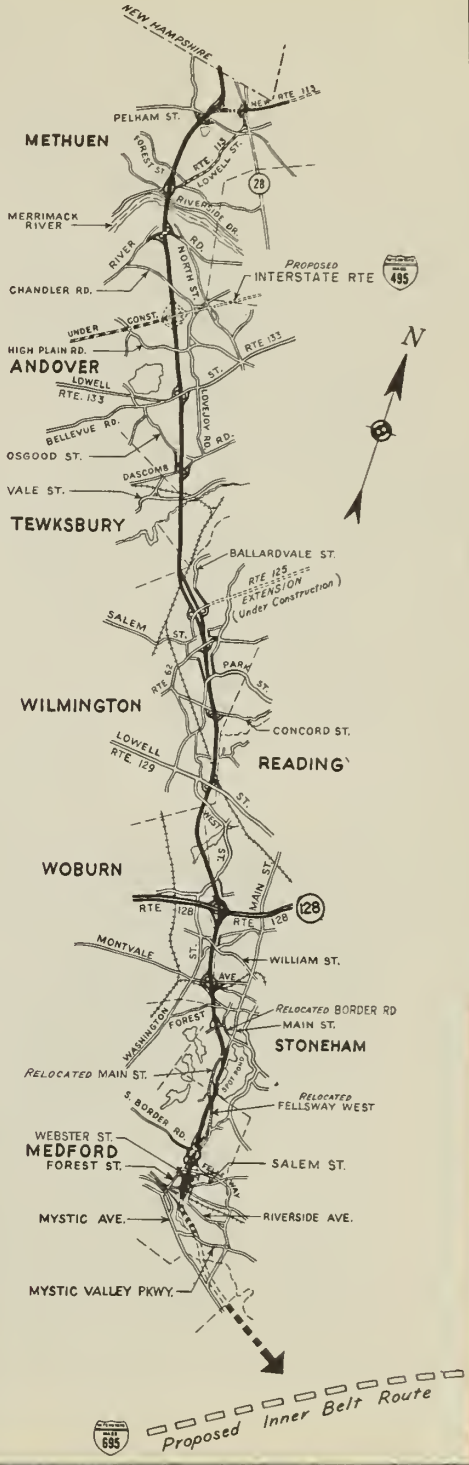
UNDER CONST.
0.8 MILES
$ 6,177,000

BASIC STUDY
1.8 MILES
$ 10,933,000

SOMERVILLE

I-93 is the first of the Interstate radial highways to extend from an adjoining state to the heart of the Metropolitan Boston area. Its significance to commerce and industry is apparent since on its southerly end it will connect with the proposed Inner Belt (I-695) in Somerville and it will also intersect two important circumferential highways-- Route 128 at the Reading-Stoneham line and the future I-495 Outer Belt in Andover.

It will provide the Merrimack Valley industrial cities of Lawrence and Haverhill with fast transportation to Route 128 and the cities of Greater Boston. Conversely, it provides easy access for Boston area cities to Route 128, the Merrimack Valley and New Hampshire points. I-93 also serves Concord, N.H., the state capitol; and St. Johnsbury, Vt. and extends to the Province of Quebec, Canada.



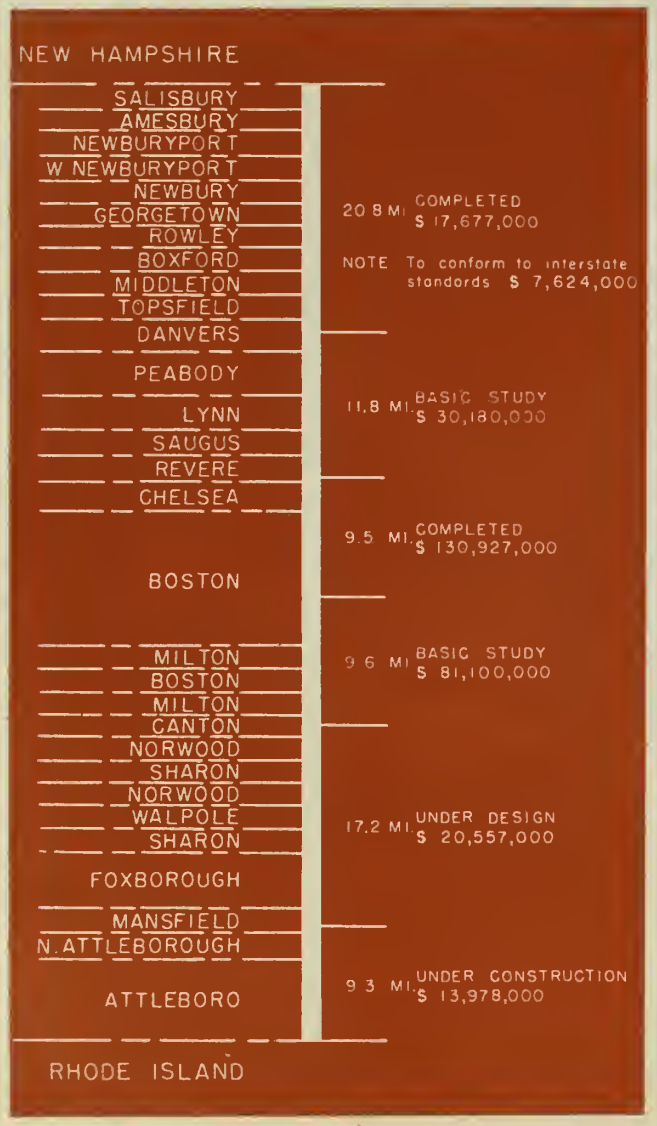
We Change Nature's Course...

Relocating the Mystic River in Medford to build I-93

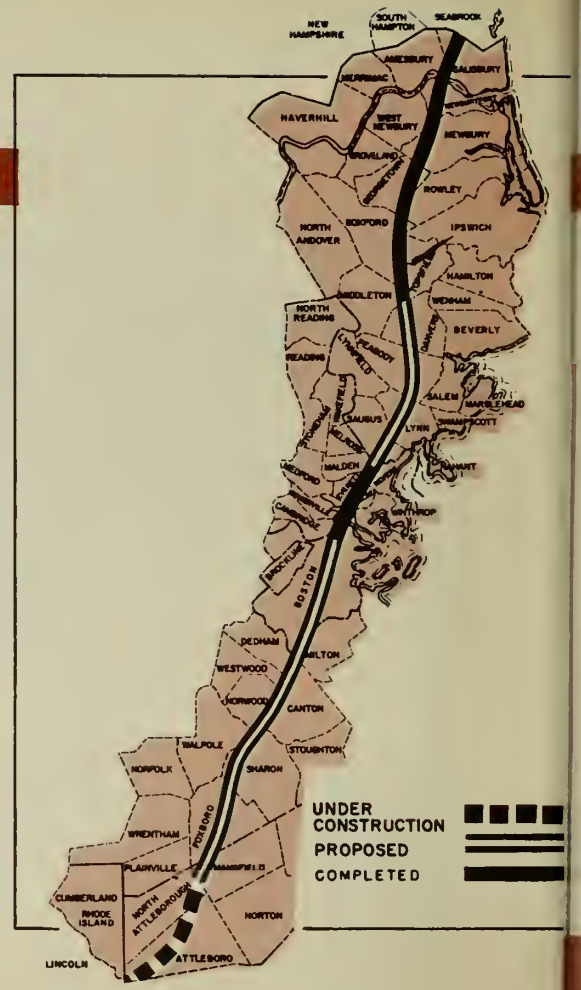
One of the largest earthmoving jobs in the Department's history is underway in Medford where the winding channel of the Mystic River is being straightened and relocated to avoid the building of several bridges to accommodate I-93 on its path southward.

In an operation costing $8,645,000, the contractor is relocating one mile of the river's channel so that only one bridge will be required to cross. The present contract will extend I-93 from Riverside Avenue to the Mystic Valley Parkway in Medford. Begun in the Spring of 1961 its probable completion date is in early 1964.

INTERSTATE ROUTE 95



Paralleling old Route 1 from New Hampshire to Rhode Island



Stretching from Maine to Florida, Interstate Route 95 will eventually supplant old Route 1 as the main through highway connecting the major cities of the Atlantic Seaboard.

In Massachusetts, 26½ miles of this important highway are either under construction or design.

In Massachusetts, nine and a half miles of this important highway are under construction in North Attleborough and Attleboro from just north of the Rhode Island line to a point half a mile south of the North Attleborough-Mansfield town line.

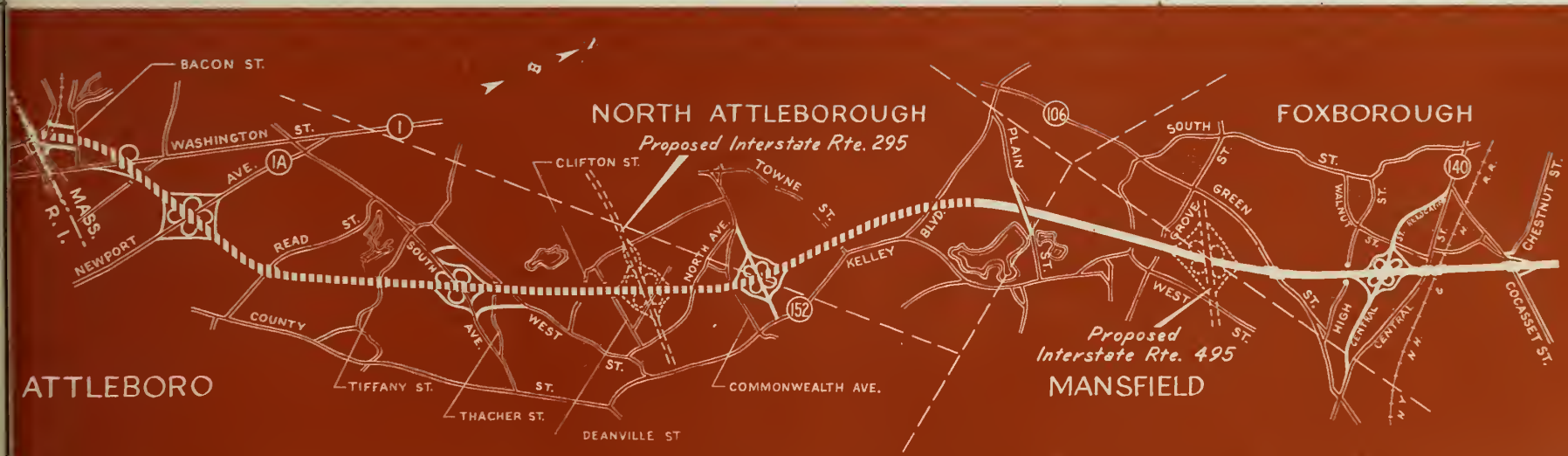
Approximately 17 miles of I-95 are under design from North Attleborough to Route 128 in Canton.

Landtakings for the next sections of the highway, from just north of Kelley Boulevard in North Attleborough, extending through Mansfield and Foxborough to Cocasset Street, will be completed before July 1, 1962 and construction on this section will commence in the fall of 1962.

Here again, as in the first five sections, construction will be for grading only since to pave it without the highway being used daily would result in deterioration of the surface.

Grading of five sections of I-95 through Attleboro and North Attleborough was completed in the Fall of 1961. Surfacing on these sections will be delayed until such time as an interchange can be built with Route 1 in Sharon.

A bridge at the Rhode Island line, currently under design by the R. I. Department of Public Works, will be jointly financed by the two states. This bridge will span a local road in Attleboro and a railroad track in Pawtucket, R. I.



Map shows the northerly extension of I-95 from Cutler Circle through Revere and Saugus to the Saugus-Lynn line, depicting four alternates with the basic line in black. Also shown are alternate alignments for the proposed improvement of Route C1 (East Boston Expressway).

A public hearing was held on these alternate routes on November 28, 1960.

Due to existing legislation, this improvement cannot be currently initiated.

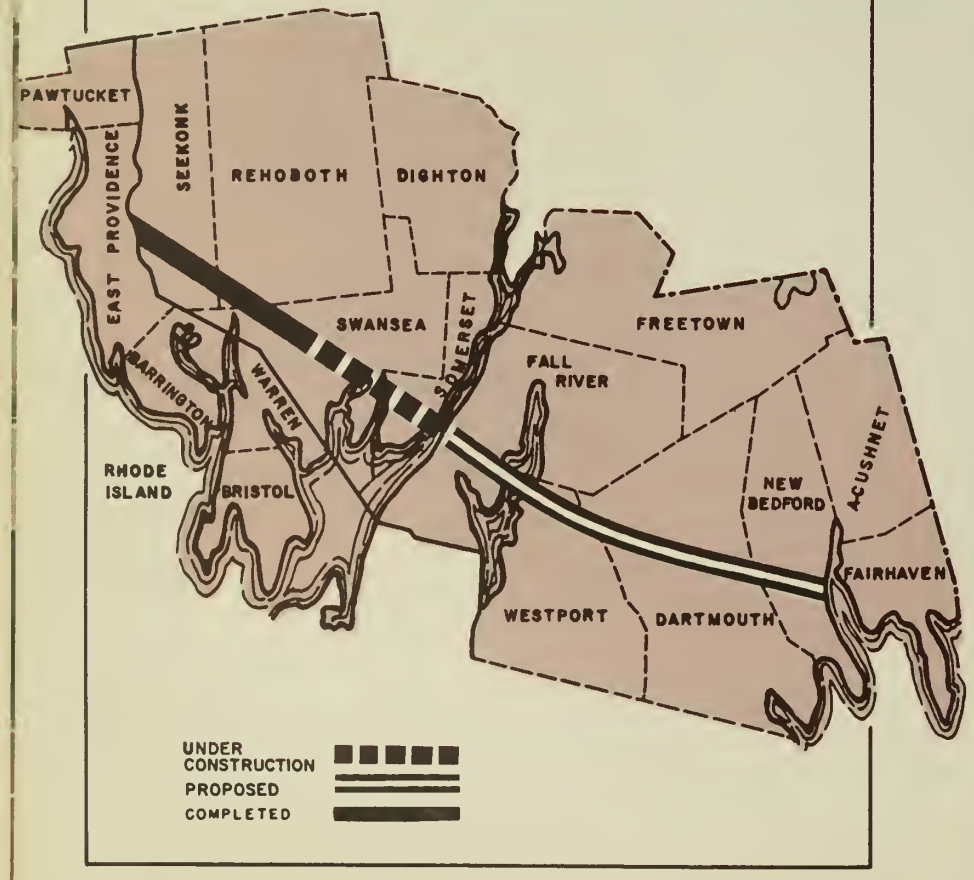
Facilities for entering Boston from the north and northeast are limited to the Northeast Expressway over the Mystic River Bridge and the Sumner-Callahan Tunnels. The proposed highways would provide a continuous system of limited access expressways to and from Boston, and will be designed to handle the projected traffic estimates for 1975.

An aerial view of Boston's Central Artery (I-95) with the Customs House Tower in center of photo. Faneuil Hall and Dock Square at lower right; Fort Hill Square at upper left.

This highway, known as the John F. Fitzgerald Expressway, is 3.8 miles in length.

INTERSTATE ROUTE 195

linking southeastern massachusetts with metropolitan providence, new york and beyond



Tangible progress was recorded this year on this important expressway. It will carry through traffic between New York and Southeastern Massachusetts connecting to Cape Cod as well as providing a valuable traffic facility between the industrial cities of Fall River, New Bedford and Providence.

Construction of the substructure is currently underway for a new Taunton River Bridge, connecting Fall River and Somerset and also on the Durfee Street Viaduct in Fall River.

The Taunton River Bridge represents the longest bridge structure ever undertaken by the Department of Public Works, being 1.1 miles long with a 135-foot vertical clearance above high water which will permit passage of the largest type of naval and merchant vessels.

The contract for construction of the bridge's superstructure was awarded in October 1961 with a bid price of $12,495,800. The substructure will cost $7,200,000. Ultimate total cost of the bridg including the deck, is estimated at $23,000,000.

Currently under construction on the Somerset side of the river is a 3.1 mile section of I-195 from the Route 6 interchange in Swansea to the wes bank of the Taunton River.

Sketch of Taunton River Bridge from Fall River side.

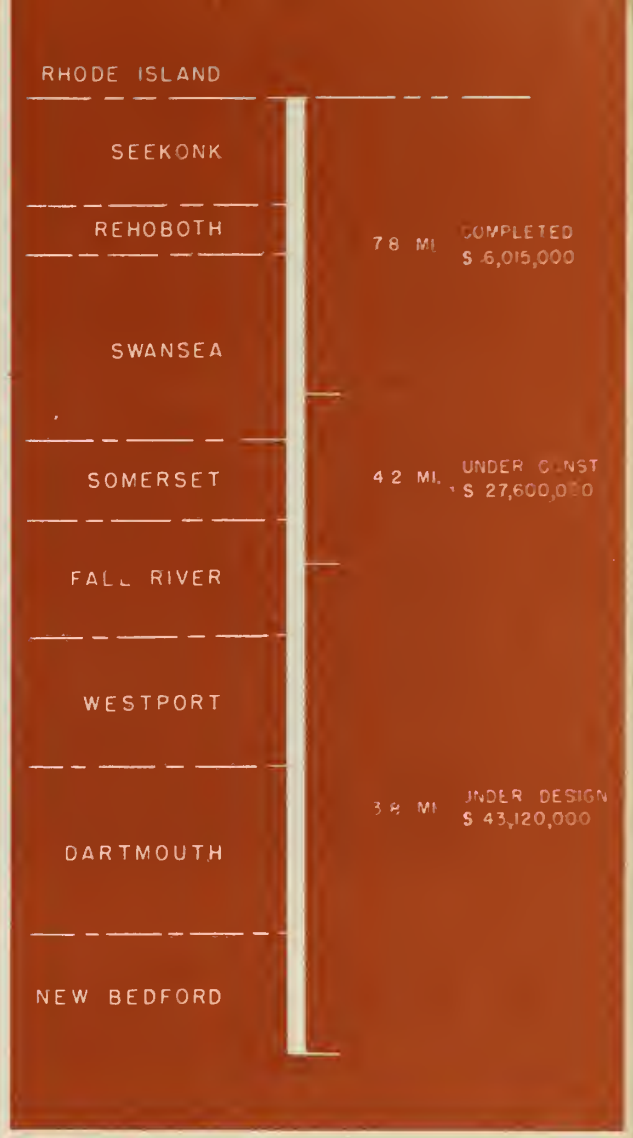
Construction began on the Durfee Street Viaduct in July 1961. This project involves a seven-span steel stringer bridge which will carry Durfee Street over I-195.

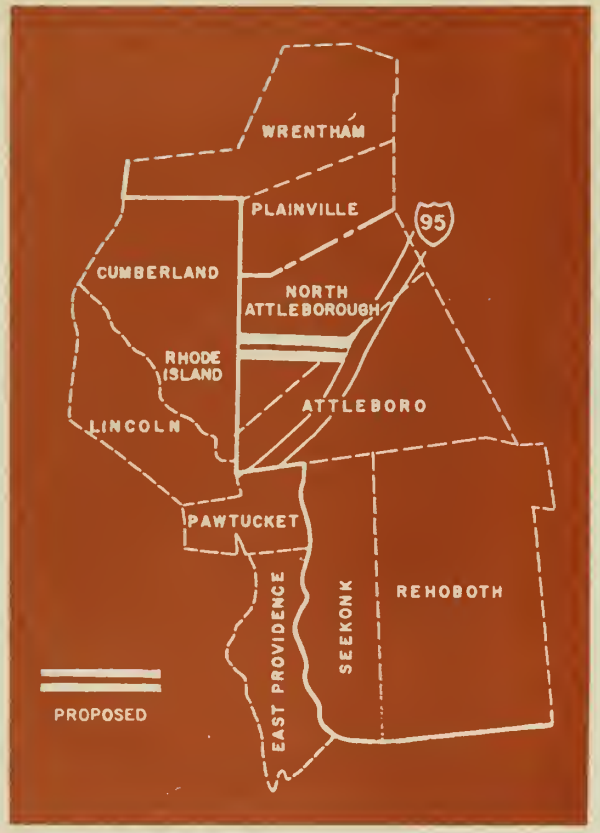
Also to be constructed is a four-lane highway from Central Street south to Columbia Street for a distance of 1700 feet. The viaduct and highway extension will facilitate circulation of north-south traffic to bypass the central business district and provide ready access to the proposed redevelopment site between Anawan and Columbia Streets.

Completion of this project will aid movement of traffic in downtown Fall River during construction of I-195.

Next section of I-195 to be constructed will extend northwesterly from the Narrows to the vicinity of Easter Avenue.

Already completed and in use on I-195 are approximately eight miles from the Rhode Island line through the towns of Seekonk and Rehoboth to the Route 6 interchange in Swansea. This section cost an approximate $6,015,000 exclusive of right of way costs.





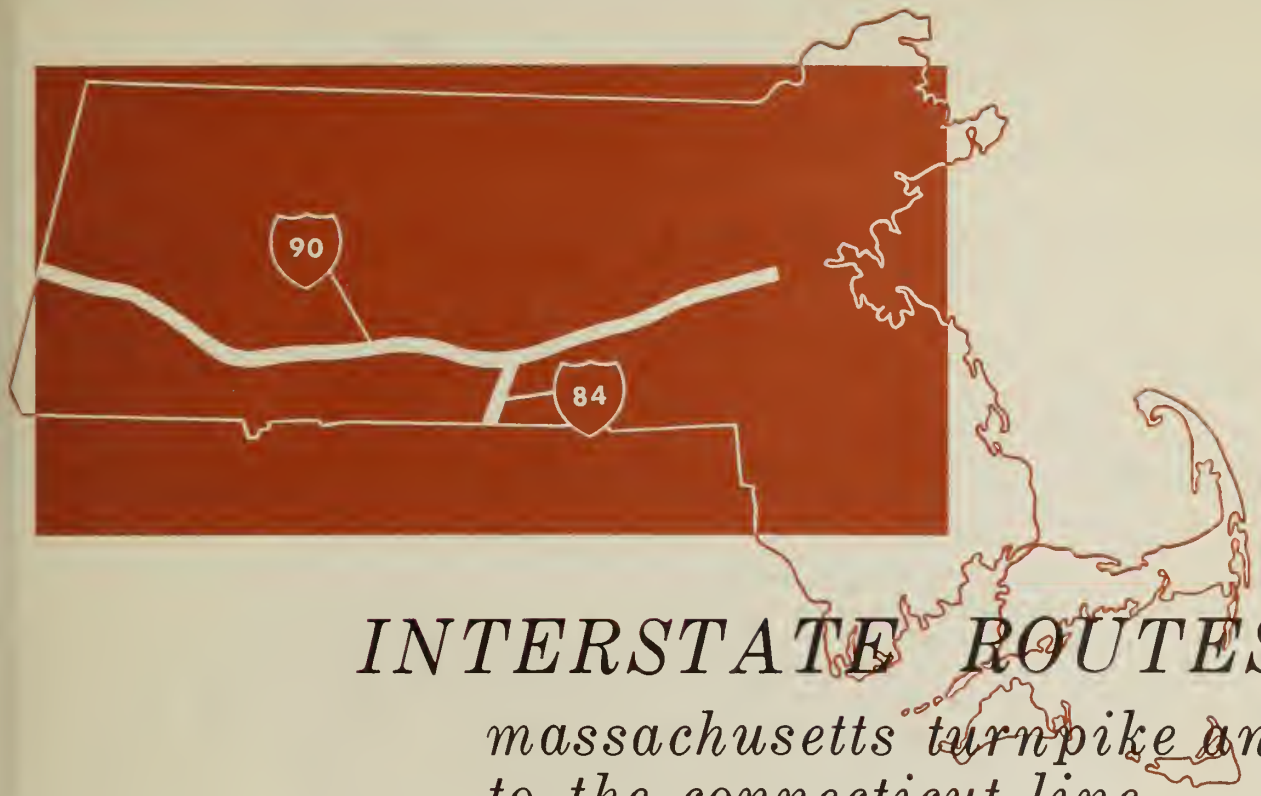
INTERSTATE ROUTE 295

This highway represents the northerly portion of the Interstate loop around Providence and Pawtucket, Rhode Island.

It will be a valuable link for Boston-Providence traffic when built. The first section of this four-lane expressway will extend from the Rhode Island line to Route 1 in North Attleborough, a distance of two miles, at an estimated cost of $2,250,000.

The second section will continue this highway from Route 1 easterly to a connection in Attleboro with I-95, currently under construction. This second stage, two miles in length, will cost $2,800,000.

Design and construction of this project will be coordinated with that of the State of Rhode Island. A public hearing on the Massachusetts section was scheduled for December 6, 1961.



INTERSTATE ROUTES 90 & 84

massachusetts turnpike and its link to the connecticut line

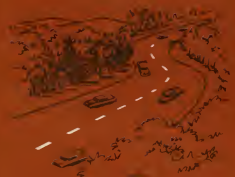
The 123.3 mile Massachusetts Turnpike carries the Federal designation of Interstate Route 90. This east-west toll road crosses Massachusetts from the New York State line at West Stockbridge in the Berkshires to Weston, where it interchanges with Route 128.

Still pending is the extension of I-90 into Boston, as either a toll road or free facility. The Turnpike Authority was authorized on February 9, 1955 by the Legislature to construct the extension into Boston.

I-84, which at present carries the designation, Route 15, is an extremely important link between the Turnpike in Sturbridge and points in Connecticut and New York. At a future date this highway will be brought up to Interstate standards, costing an estimated $2,353,000 for a 6.8 mile section.

We Build ...

PRIMARY , SECONDARY & URBAN Highways



the A B C systems 50-50 program

The Commonwealth receives matching Federal funds on a 50-50 basis for construction of highways on the primary and secondary systems and their urban extensions. The allocations of Federal funds to this State are based on fixed formulas and this results in a definite quota of Federal funds which limits the extent of Department progress in improving these systems.

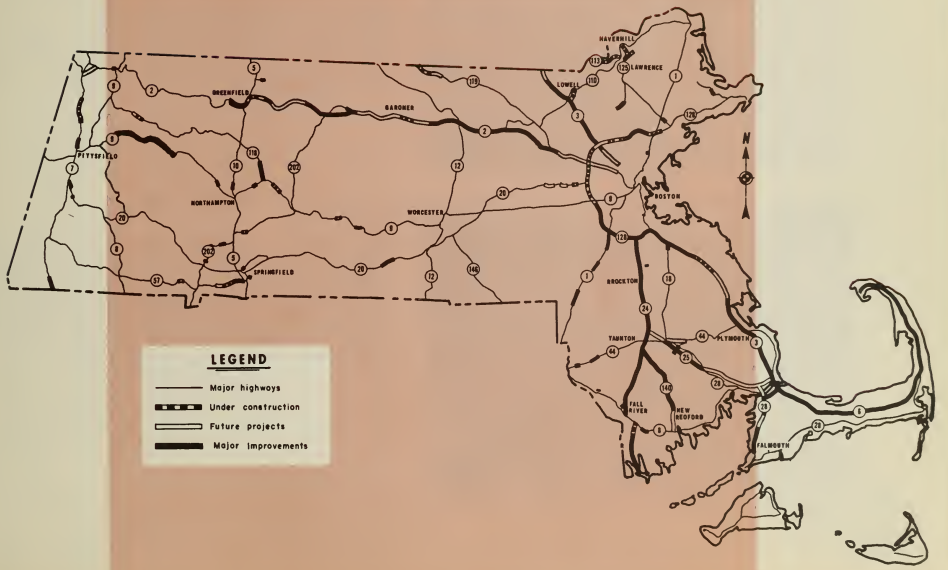
The ABC highway systems provide a network of roads which are vital to the economy of the cities and towns of Massachusetts. These highways are defined as follows:

Primary--	major highways
Secondary--	feeder roads and farm-to-market roads
Urban--	extensions into urban areas

A continuing program of construction, reconstruction, relocation and resurfacing of these roads is conducted by the Department of Public Works to keep these roads safe and serviceable for ever-increasing traffic volumes.

As noted above the limited funds available for the ABC Systems are never sufficient to provide for the needs of the Commonwealth and, as a result, many worthwhile projects have to be deferred.

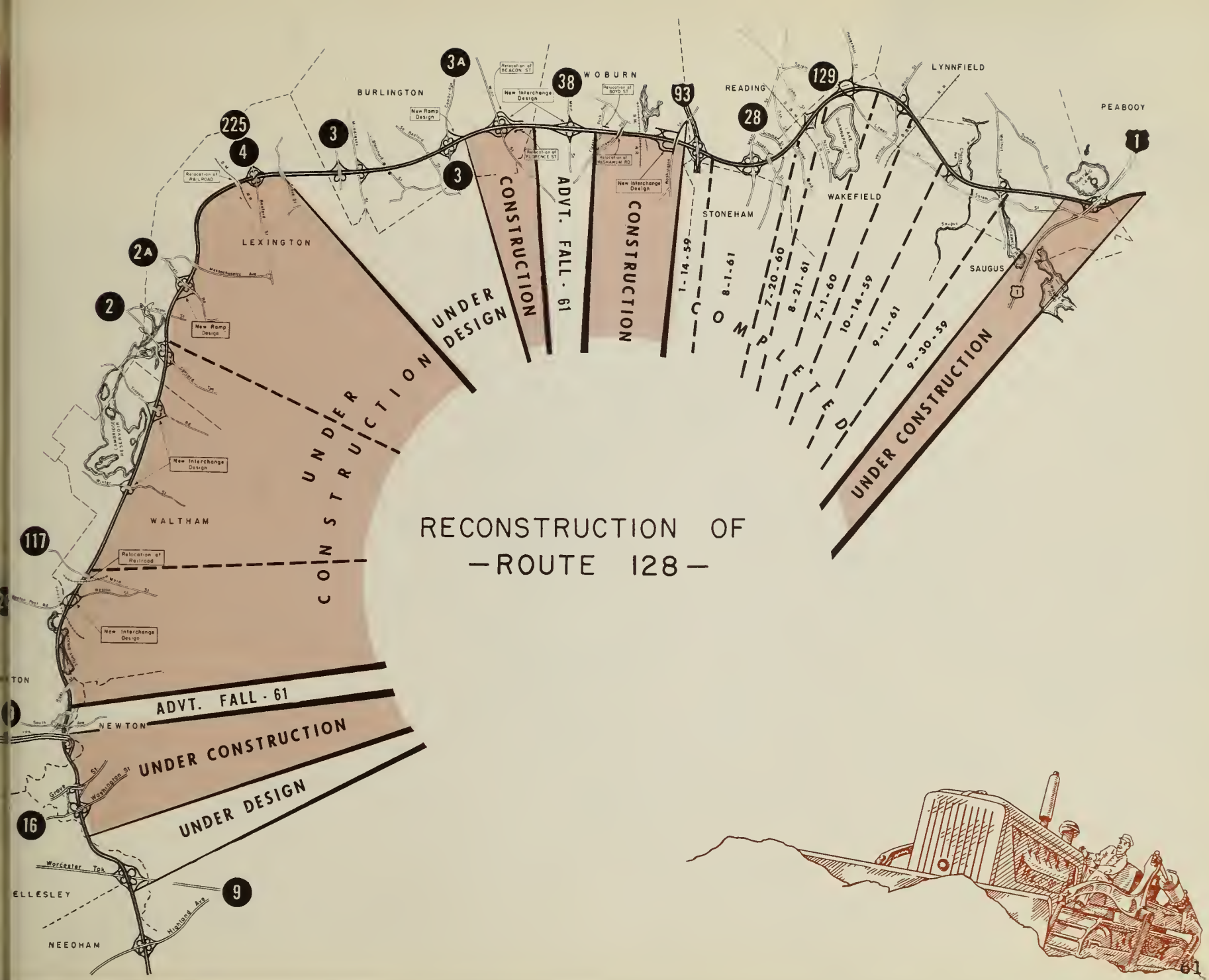
MAJOR IMPROVEMENTS on A B C HIGHWAYS



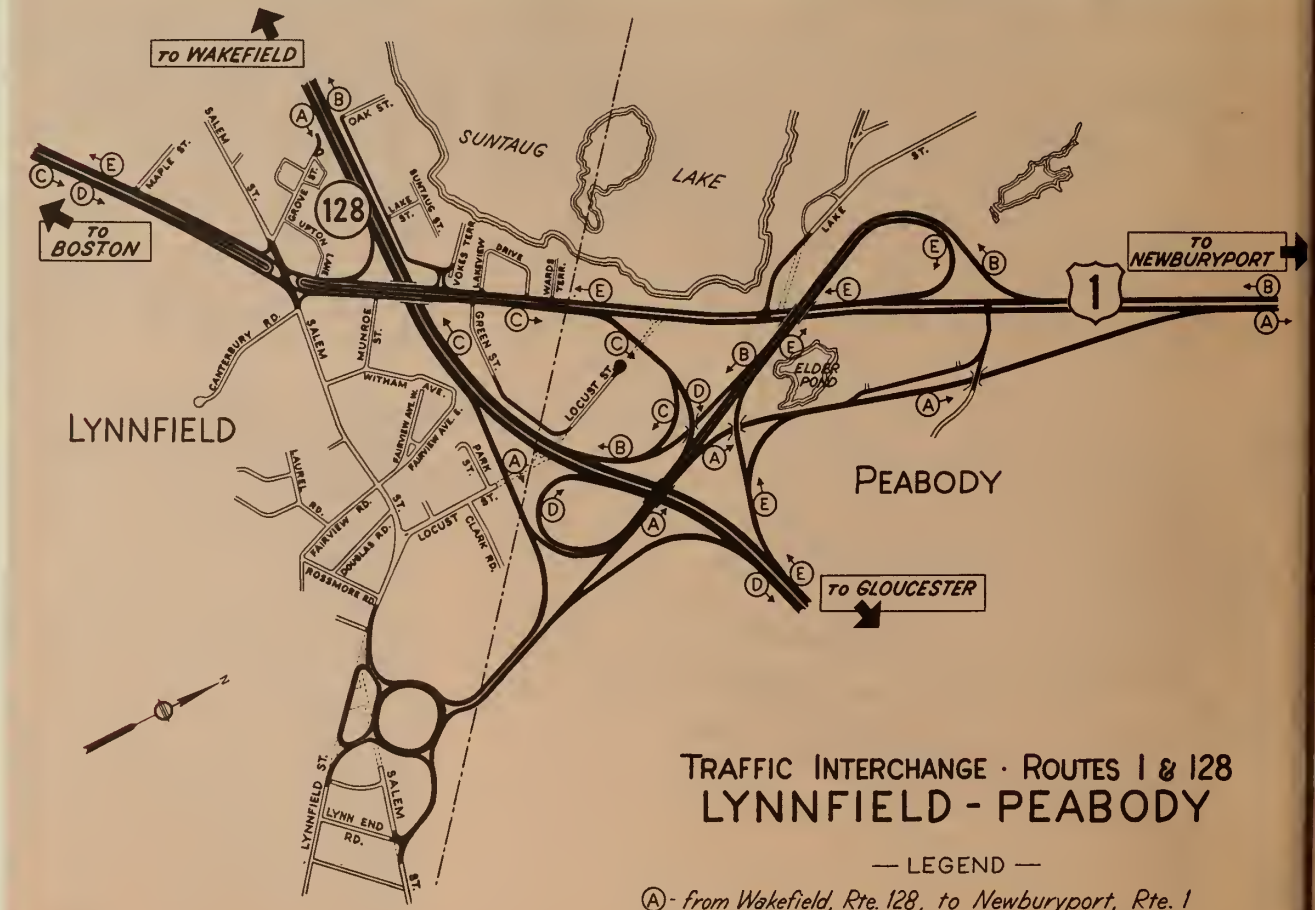
WIDENING OF ROUTE 128 PROGRESSES

Approximately $25,000,000 worth of construction work was in progress along famed Circumferential Route 128 in 1961, from Route 9 in Wellesley to Route 1 in Lynnfield and Peabody. New contracts were awarded and construction begun in 1961 in Newton, Wellesley and Weston; Lexington; Burlington; and Woburn adding 7 miles and making a total of 16 miles of Route 128 under construction.

Between Route 9, Wellesley and Route 3A, Burlington, widening of Route 128 will be fro 4 to 8 travel lanes plus breakdown lanes. Beyond Route 3A in Burlington, easterly to Route 1, the highway will be widened to six travel lanes and a breakdown lane in each roadway. Al bridges, however, will be widened or replaced to accommodate eight travel lanes.


RECONSTRUCTION OF
—ROUTE 128—
UNDER CONSTRUCTION
UNDER DESIGN
CONSTRUCTION
ADVT. FALL - 61
CONSTRUCTION
COMPLETED
1-14-59
8-1-61
7-20-60
8-21-61
7-1-60
10-14-59
9-1-61
9-30-59
UNDER CONSTRUCTION
ADVT. FALL - 61
UNDER CONSTRUCTION
UNDER DESIGN
BURLINGTON
WOBURN
READING
LYNNFIELD
PEABODY
STONEHAM
WAKEFIELD
SAUGUS
LEXINGTON
WALTHAM
NEWTON
ELLESLEY
NEEDHAM
225
3A
38
93
129
28
1
4
3
2A
2
117
16
9

OUR BIGGEST INTERCHANGE...



TRAFFIC INTERCHANGE · ROUTES 1 & 128
LYNNFIELD - PEABODY

— LEGEND —

Ⓐ - *from Wakefield, Rte. 128, to Newburyport, Rte. 1*
Ⓑ - *from Newburyport, Rte. 1, to Wakefield, Rte. 128*
Ⓒ - *from Boston, Rte. 1, to Wakefield, Rte. 128*
Ⓓ - *from Boston, Rte. 1, to Gloucester, Rte. 128*
Ⓔ - *from Gloucester, Rte. 128, to Boston, Rte. 1*

Scheduled for final completion in early 1962 is the giant interchange between Routes 128 and 1 at Lynnfield and Peabody.

Opening of the full interchange to unrestricted traffic sounds the death knell of one of the state's worst bottlenecks. This massive project required the construction of seven bridges, a tunnel under Salem Street, Lynnfield and ten miles of ramps, access roads and divided highway.

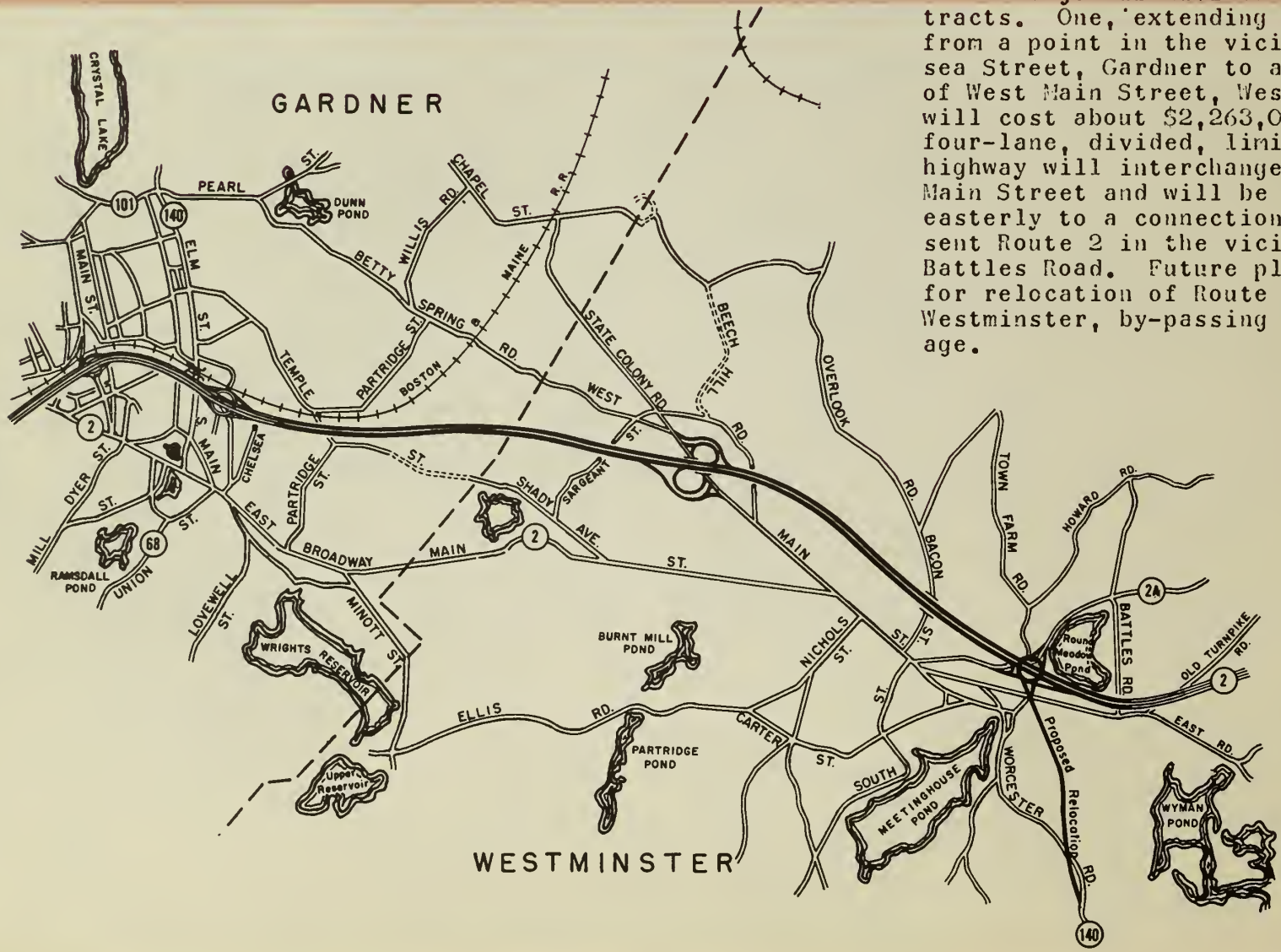
The interchange occupies approximately 18,000,000 square feet, or an area just under one square mile. It will accommodate the 118,000 vehicles per day anticipated in 1980. Started in the summer of 1959, total cost, including right of way, is about $7,500,000.

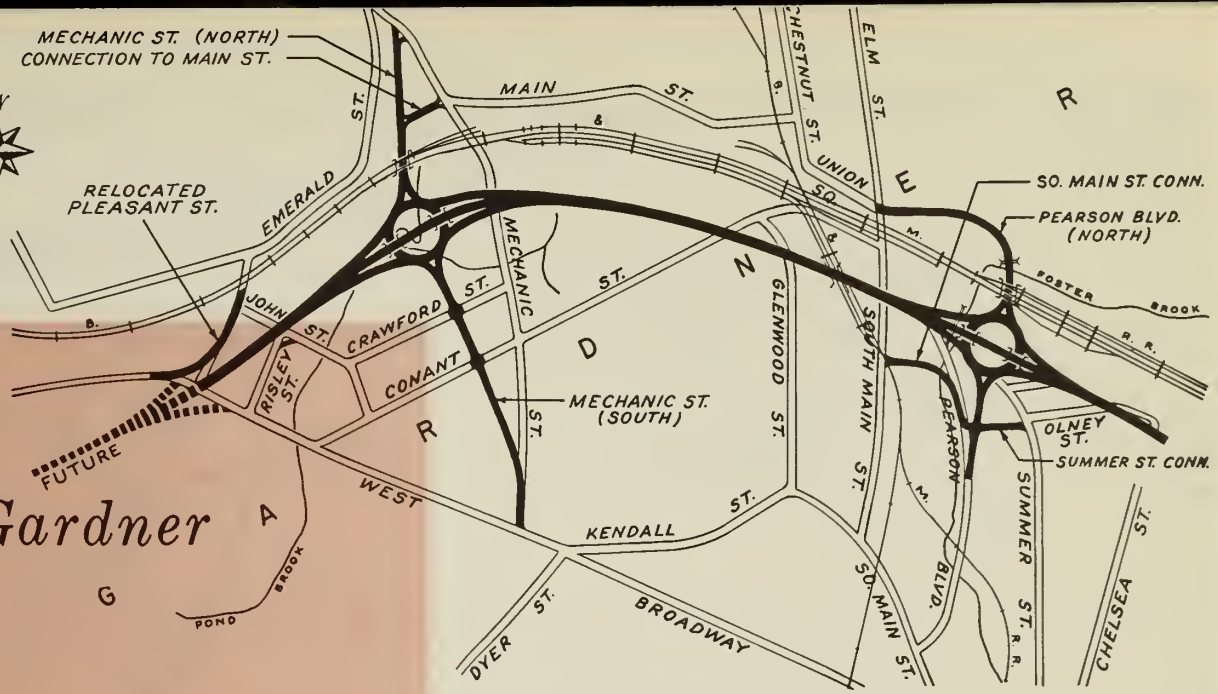
Salem Street Underpass at Lynnfield which opened to traffic, July 28, 1961. This underpass serves Route 1 traffic in both directions. Route 128 crosses under Route 1 toward top of photo. Lake Suntaug at left.

New Route 2 in Gardner & Westminster ...

Construction began this Fall on three miles of relocation of Route 2 in Gardner and Westminster.

The job is divided into two contracts. One, extending two miles from a point in the vicinity of Chelsea Street, Gardner to a point east of West Main Street, Westminster, will cost about $2,263,000. This four-lane, divided, limited access highway will interchange with West Main Street and will be continued easterly to a connection with present Route 2 in the vicinity of Battles Road. Future plans call for relocation of Route 140 in Westminster, by-passing the village.





A new look for Gardner

Route 2 relocation ...

Gardner will take on a new look with the building of the relocated Route 2 through that city.

A second contract for $3,143,000 involves construction of a little more than a mile of Route 2 from the end of the first contract in the vicinity of Chelsea Street to a point on West Broadway. This project will feature seven bridges and rotary interchanges at Mechanic Street and at Pearson Boulevard.

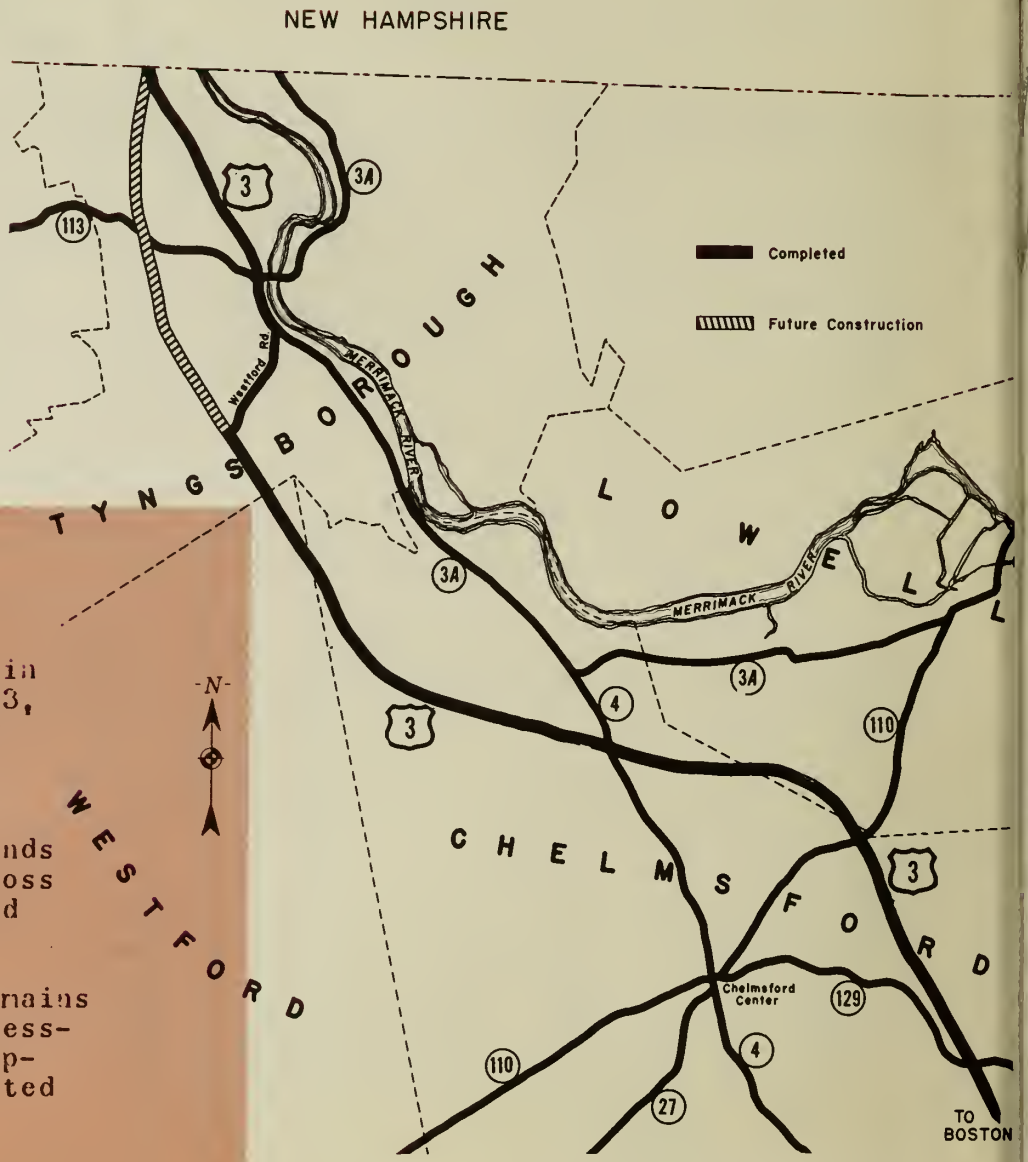
The new Route 2 will run south of and parallel to the Boston & Maine Railroad, between the main business district and South Gardner. Mechanic Street will be relocated, eliminating the present railroad grade crossing. A new bridge will be constructed along the relocated Mechanic Street. This will serve as an important feeder northerly into Main Street and the business center.

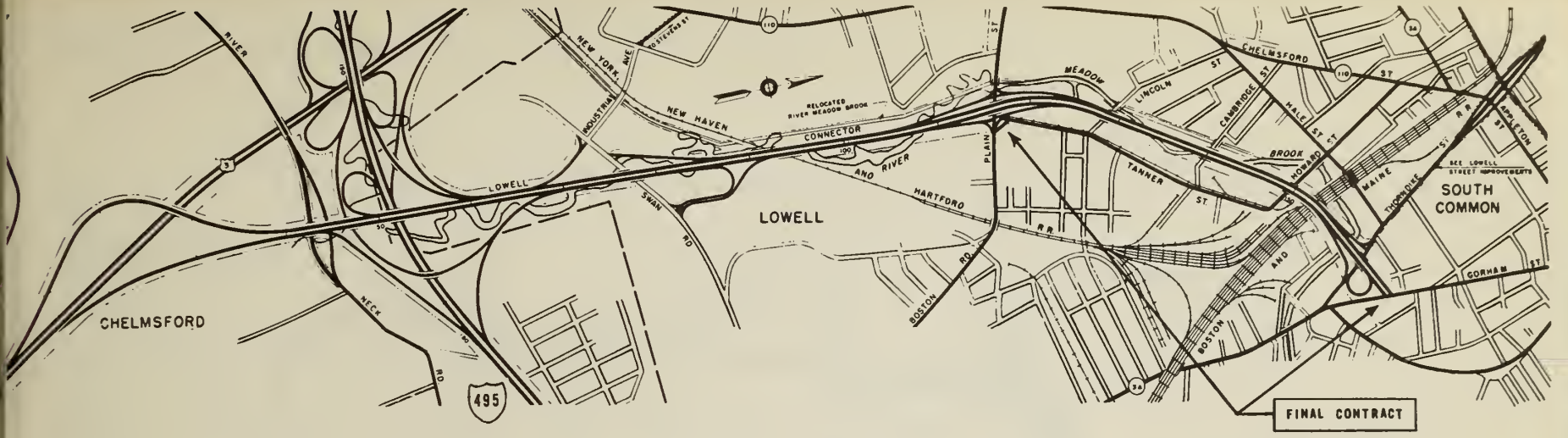
Route 3 Improvement Eliminates Chelmsford Bottleneck...

A badly congested traffic condition in North Chelmsford was eliminated on June 23, 1961 with the opening of 4.4 miles of new Route 3 through Chelmsford, Westford and Tyngsborough.

The so-called Chelmsford Bypass extends northerly from Route 4 in Chelmsford, across a corner of Westford, to the reconstructed Westford Road in Tyngsborough.

Only about three miles of Route 3 remains to be relocated to provide unimpeded expressway service between Route 128 and New Hampshire. This new section will be constructed as funds are made available.





the Lowell Connector - Link to Industrial Revival

Lowell Connector with I-495 crossing vertically and Route 3 at top.

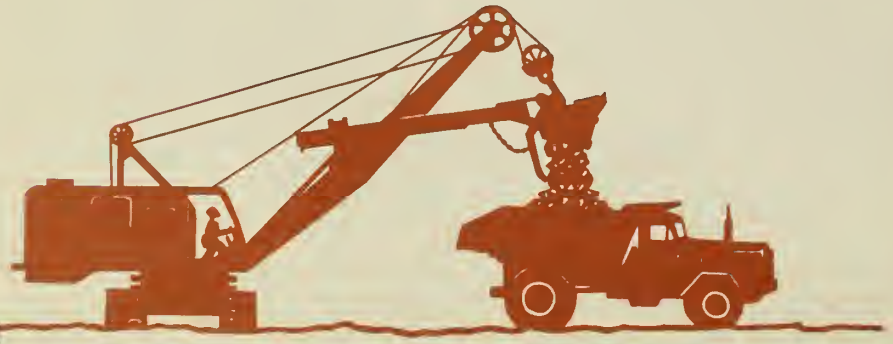
Construction is proceeding on the Lowell Connector, a vital link between the industrial city of Lowell and the major expressways of I-495 and Route 3.

The Lowell business district will be served by a limited access, dual type highway extending 2.5 miles from I-495 and Route 3 interchanges at the Chelmsford-Lowell line.

The Department of Public Works is constructing a chemical treatment plant for the City of Lowell as an integral part of this project. Since the Connector runs through a well field which supplies water to Lowell, some of the wells had to be destroyed and new ones driven. The new wells were found to contain excess amounts of mineral and vegetable matter and thus the need for a chemical treatment plant. Total cost of the Lowell Connector is estimated at $8,000,000.

Final completion date for the Lowell Connector is the Fall of 1962, although Chelmsford sections will be completed earlier.

Route 113 in Methuen - Connecting Two Important Interstate Routes...



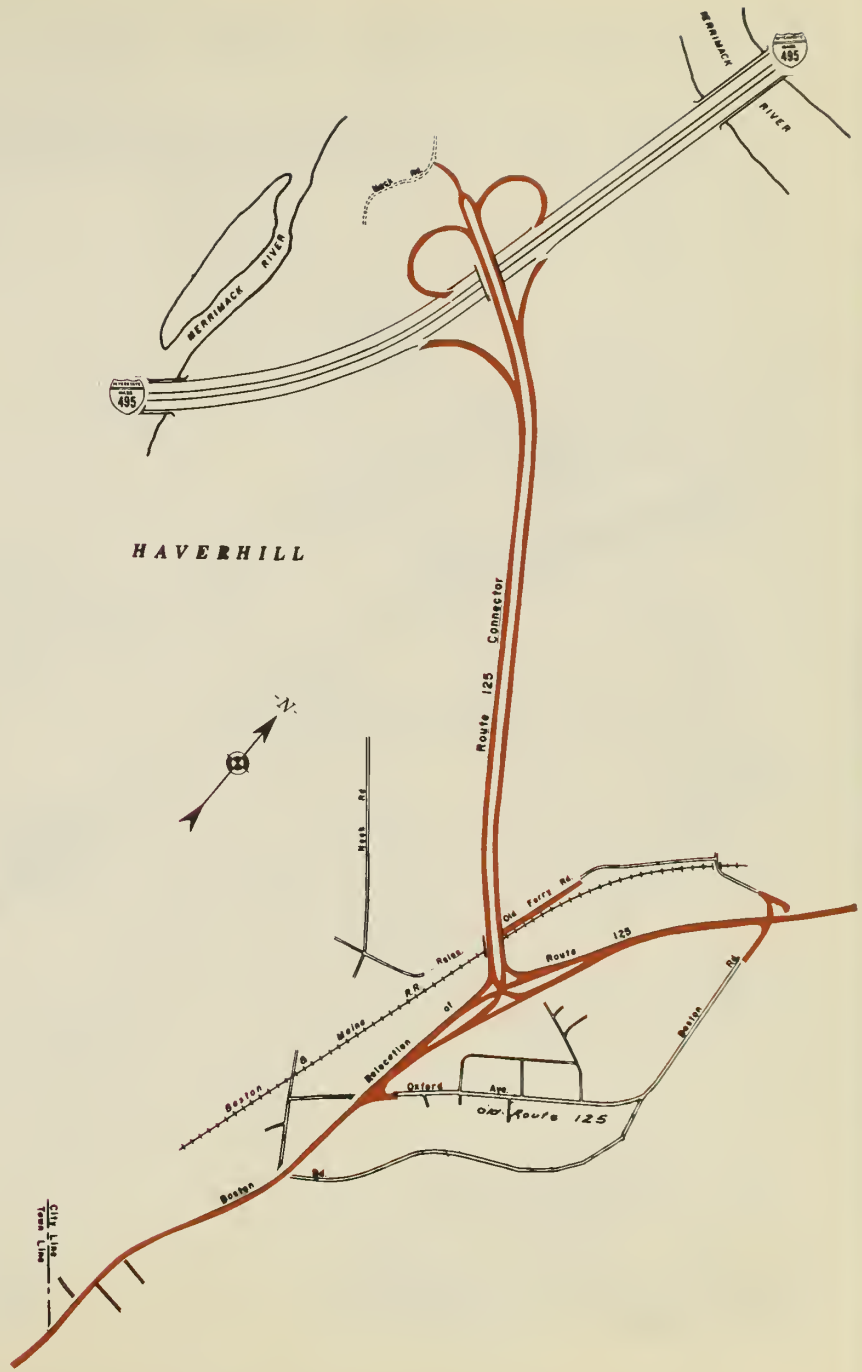
Ground was broken May 23, 1961 for construction of the easterly extension of new Route 113.

This 1.5 mile link with I-495, coupled with the link on the western end with I-93, will provide an expressway belt route for metropolitan Lawrence. Under the current contract, the four-lane divided highway will be extended from a point west of Howe Street and Marstons Corner easterly to Pleasant Valley Street. A bridge will be constructed at Howe Street to carry local traffic over the expressway. Completion date is late Summer, 1962.

Route 125 Connector - Haverhill

One of the most important new urban connectors is the relocation of Route 125 which job got underway in June 1961.

About a mile in length, this highway will connect existing Route 125 with the Outer Belt (I-495) without traversing built-up residential and industrial sections of Haverhill. Costing $148,000 for construction, this connector should be completed in the late summer of 1963.

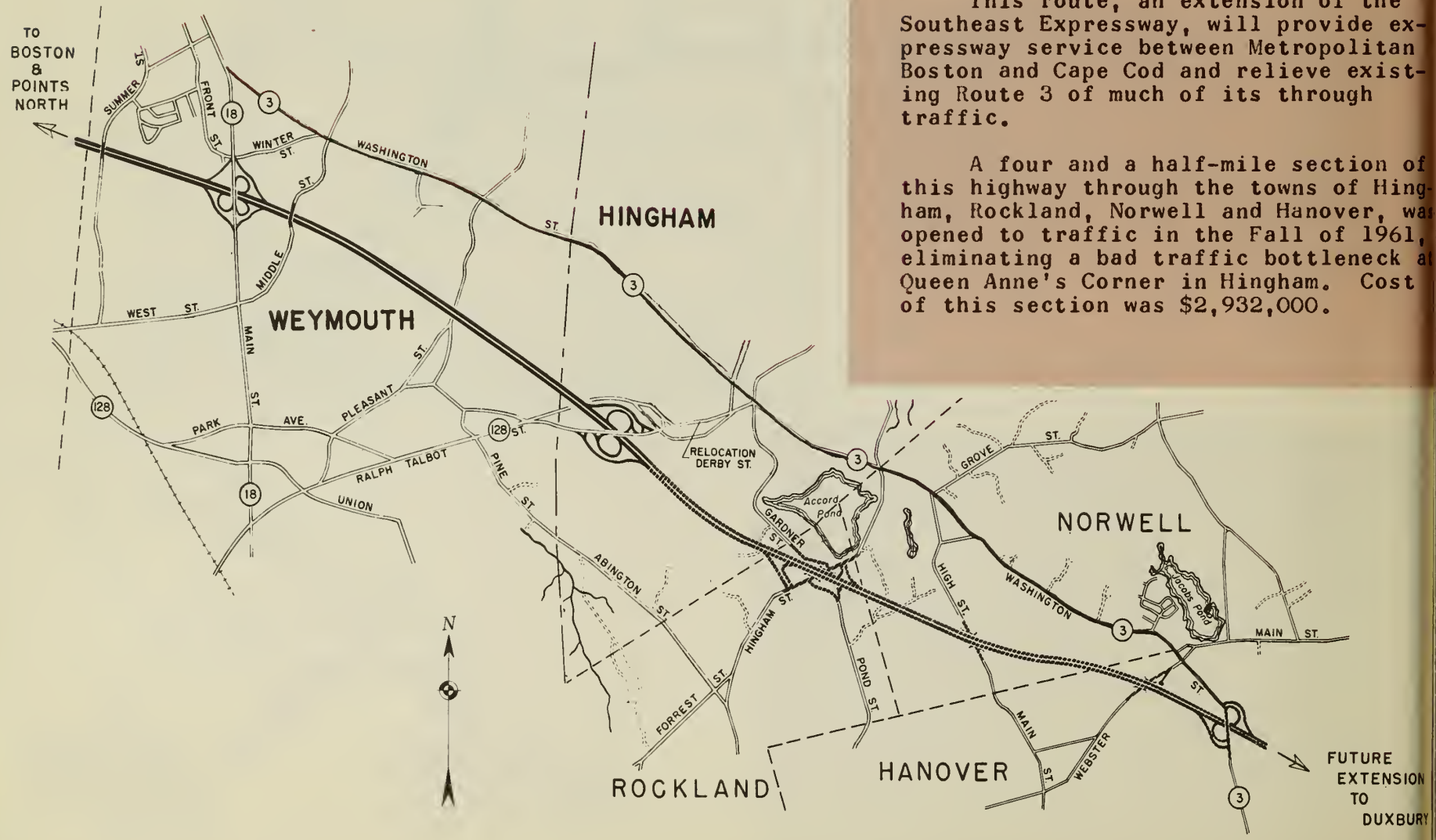


Narrowing the gap in the Pilgrims Highway

Pilgrims Highway (Route 3) is an important segment of the Federal-Aid Primary System. It is anticipated that heavy increases in vacation and tourist traffic flow to Cape Cod will be experienced with the coming of the Cape Cod National Park.

This route, an extension of the Southeast Expressway, will provide expressway service between Metropolitan Boston and Cape Cod and relieve existing Route 3 of much of its through traffic.

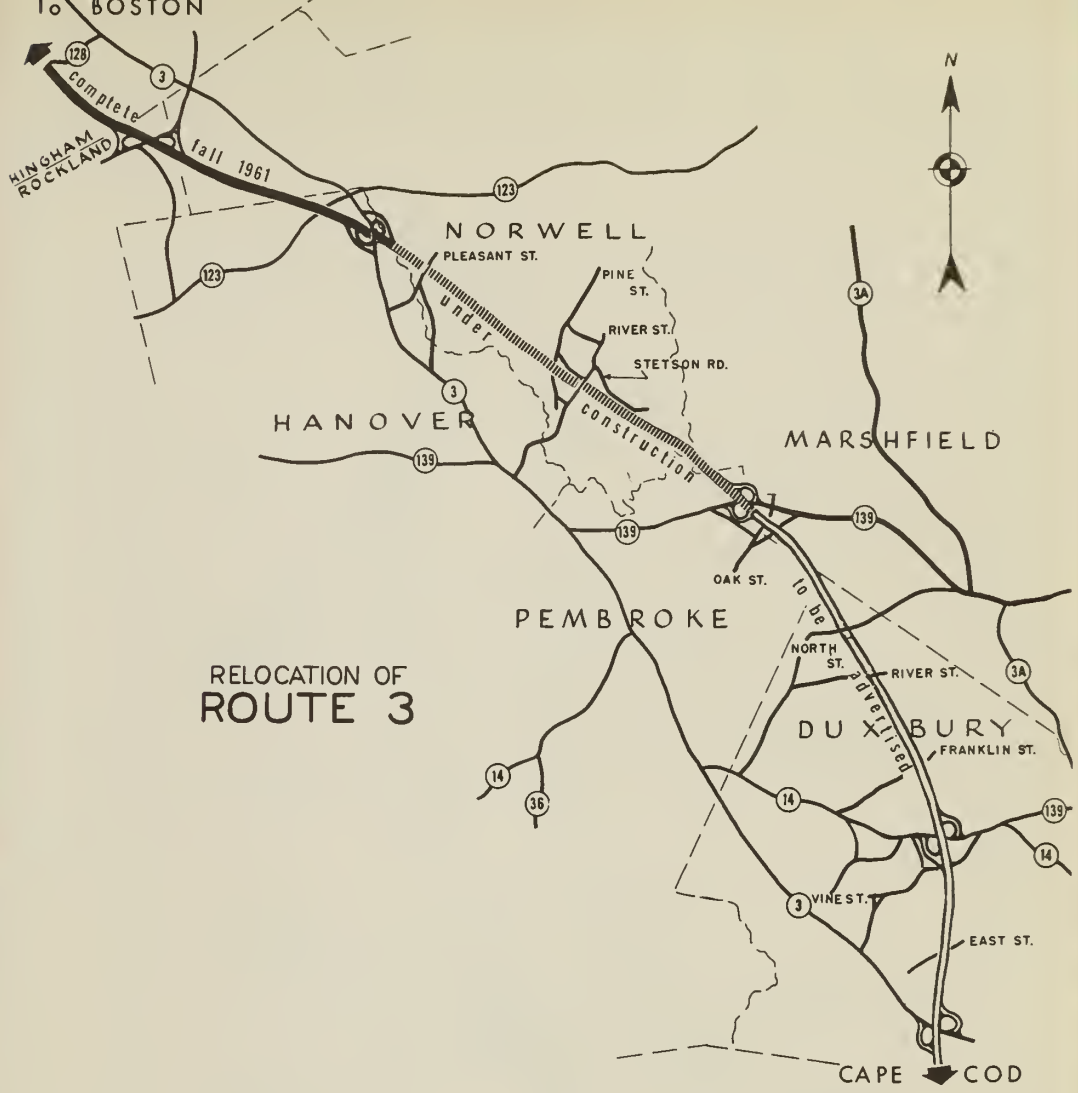
A four and a half-mile section of this highway through the towns of Hingham, Rockland, Norwell and Hanover, was opened to traffic in the Fall of 1961, eliminating a bad traffic bottleneck at Queen Anne's Corner in Hingham. Cost of this section was $2,932,000.



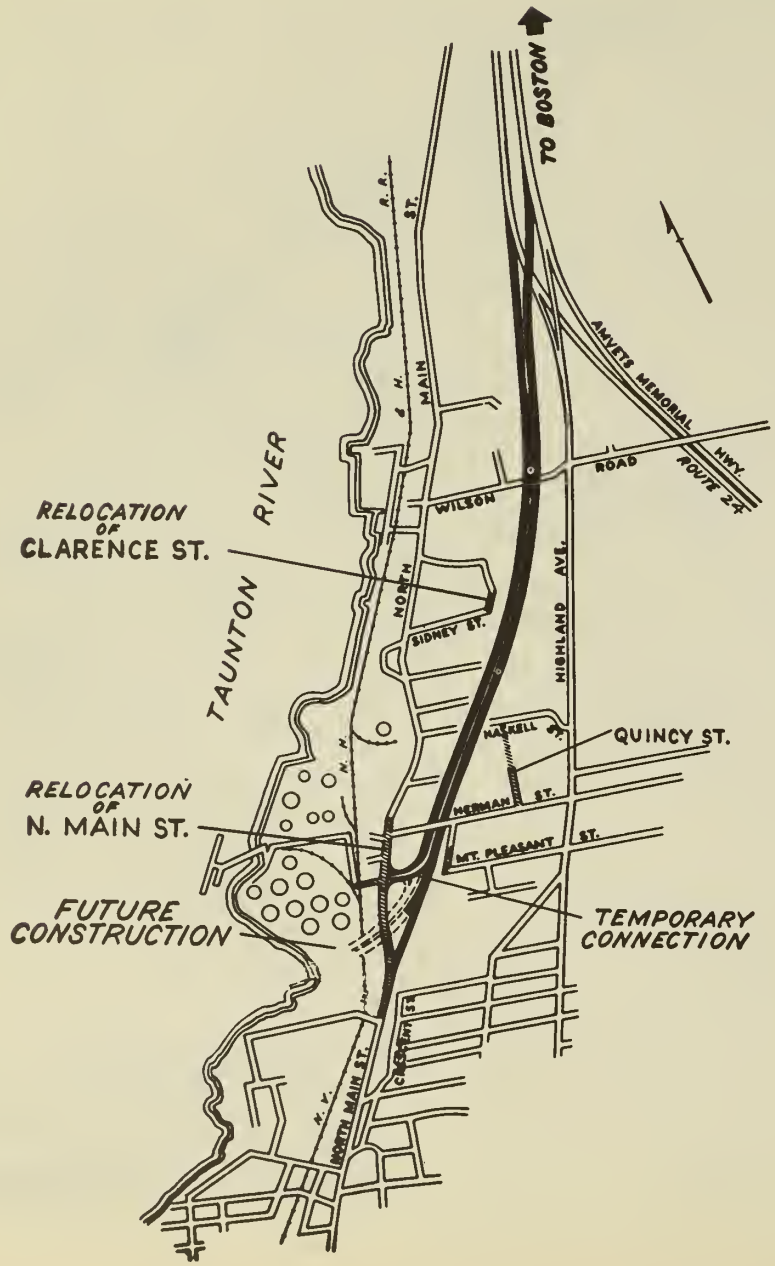
Remaining to be constructed in order to close the gap on this popular Cape Cod tourist route, are 11 miles between Hanover and Duxbury. Construction started during the Fall on a five-mile section of the gap southerly through the towns of Hanover, Norwell, Marshfield and Pembroke. This will extend the highway southerly from an interchange with Route 3 in Hanover to an interchange with Route 139 at the Pembroke-Marshfield town line. Cost of this contract will be approximately $3,655,000.

A total of nine bridges will be constructed in this section. Access will be provided in the town of Norwell at Pleasant and River Streets. Completion date for this section is tentatively set as December 1963.

Scheduled to be advertised for bids in 1962 will be the remaining six miles through Pembroke and Marshfield to a link-up with the end of the completed Route 3 expressway in Duxbury, near the Kingston line.



Fall River Western Expressway ...

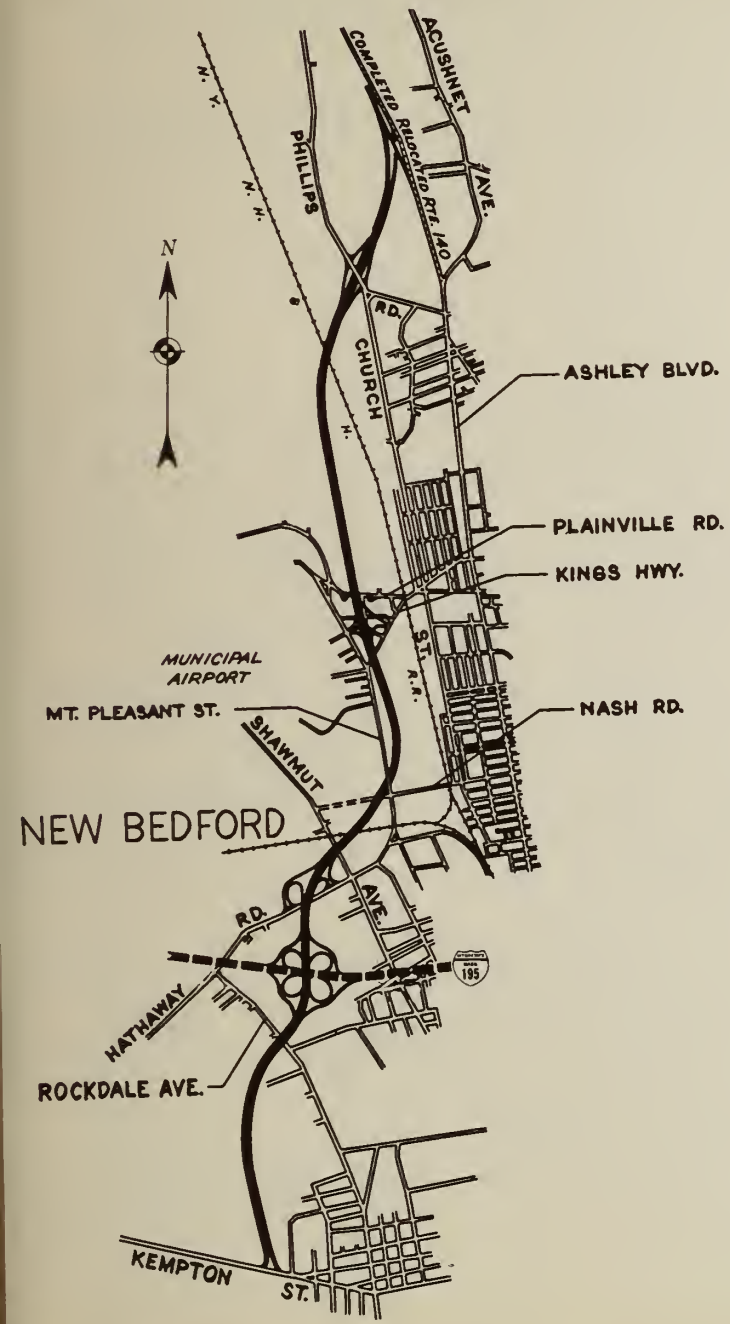


The first section (southbound roadway) of the vital Fall River Western Expressway was recently opened to travel and the northbound roadway is expected to be opened in December 1961. The four-lane, divided highway extends southerly for 1.7 miles from Route 24 (AMVETS Memorial Highway).

The Western Expressway will ultimately be extended further south to connect with I-195 and will thus provide north-south expressway service for the western part of this port city.

Cost of the completed extension was $2,388,000.

Relocation of Route 140 in New Bedford ...



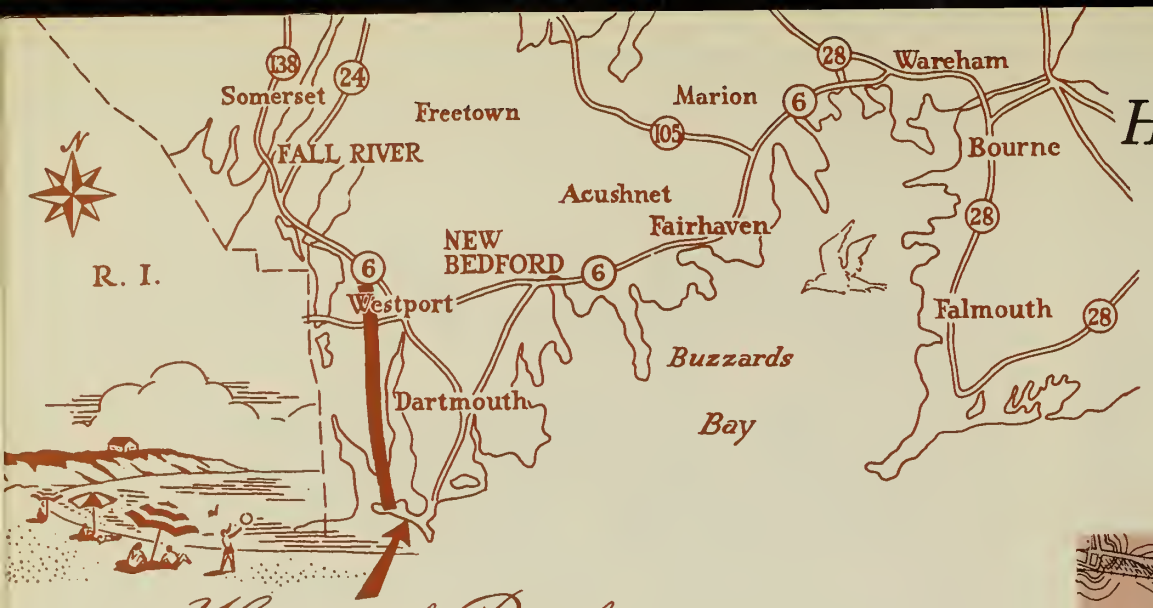
New Bedford will enjoy north-south express highway service with the eventual relocation of Route 140 through the city.

Route 140, running north and south, will interchange with I-195 which will link New Bedford with Fall River and Providence to the west and Cape Cod routes to the east.

Route 140 will connect with Route 6 (Kempton Street) on the south, giving better traffic service to the western section of New Bedford.

This relocation project will be undertaken within Department priorities and when the very limited Federal-aid 50-50 money becomes available.

A major step forward in the relocating of Route 140 was taken in the fall of 1960 when a 13.8 mile section linking New Bedford with Taunton was completed. The portion completed will serve as one roadway of an eventual double-barreled limited access highway.



Horseneck Beach Road

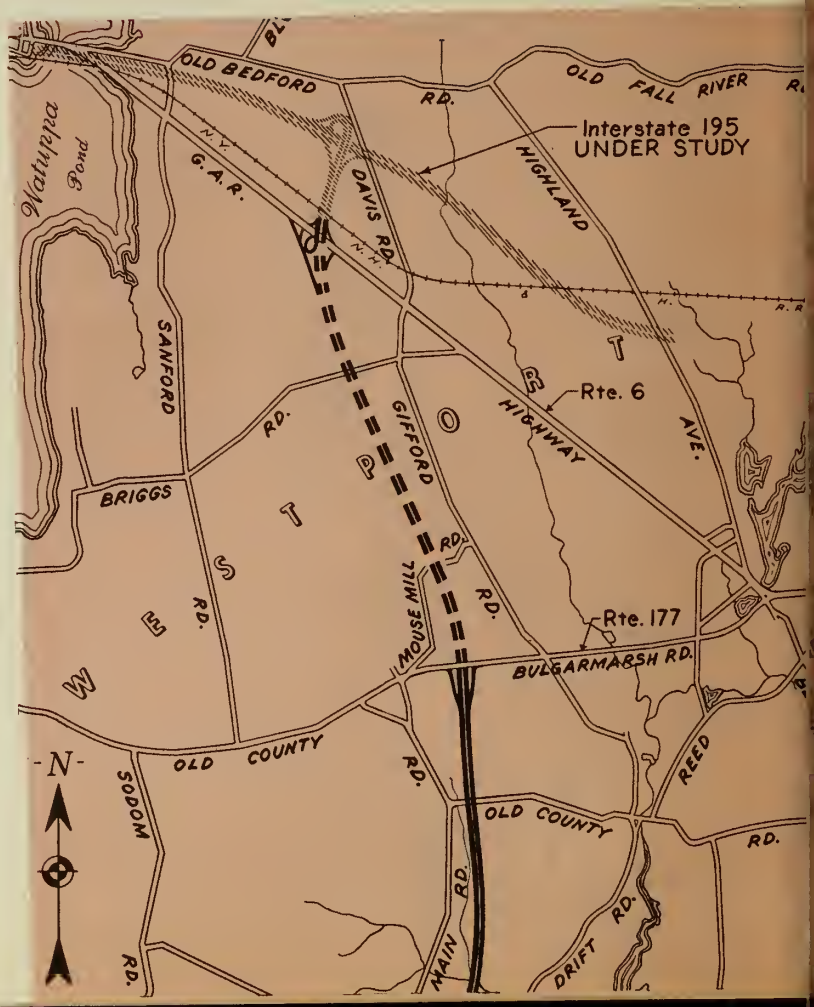
serving one of our finest recreational areas

Horseneck Beach

Nine miles of Horseneck Beach Road are open to traffic, marking a milestone in providing traffic service to this popular Commonwealth beach in Westport. This highway now extends from the entrance of the beach reservation northerly to a junction with Route 177.

In addition to a four-mile section opened in June 1961, another 2.2 miles of this limited-access Federal-Aid Secondary road is currently under construction and is due for completion in the late Summer of 1962. This section will link with Route 6 and eventually will tie in with I-195.

This section of highway will have two bridges and will be invaluable in serving the more than a million and a half visitors annually to Horseneck Beach.



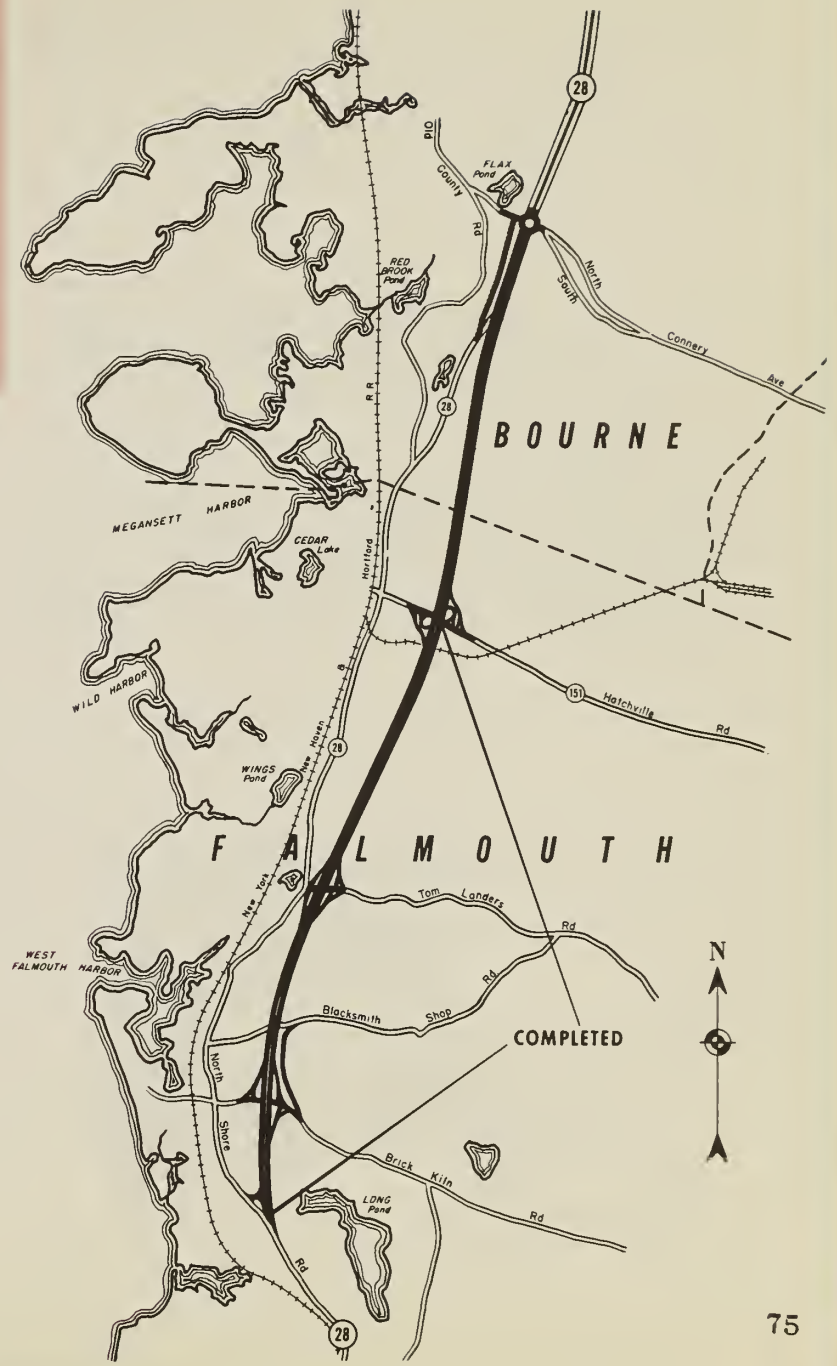
Route 28 in Falmouth...

Another 2.6 miles of relocated Route 28 in almouth was opened to traffic in the Fall of 961 making a total of 5.2 miles of new Route 8 constructed in Falmouth since 1959.

The new section extends northerly from Tom anders Road to Hatchville Road (Route 151). ncluded in the construction is the relocation f Tom Landers Road 200 feet northerly of its resent location in the vicinity of the new oute 28. Access to Tom Landers Road was creat- d through a simple ramp system.

Next step will be to relocate Route 28 ortherly through Bourne and build an improved raffic circle at the entrance of Otis Air orce Base. Also planned is the improvement f one mile of existing Route 28 southerly from he Bourne traffic circle.

Relocated Route 28, in this area, serves to ake much through traffic off the local streets n West Falmouth.



Route 7 in Lanesborough and New Ashford ...

Reconstruction was begun in April 1961 on 4.6 miles of Route 7, the major north-south artery in the Berkshires.

This will be a two-lane highway with four bridges. Grades and alignment will be improved. Important to Pittsfield, Williamstown and Bennington, Vermont through traffic, this project is scheduled for completion in the Spring of 1962.

Route 57-Agawam ...

An important interchange of Route 57 and 75 at Suffield Street is under construction with a connection extending Route 57 westerly to Mill Street.

Started in July 1961, its completion in the summer of 1962 will connect relocated Route 57 in a straight line with the South End Bridge over the Connecticut River.

Route 1 in Norwood

Route 1 is now a divided highway all the way from Boston to Norwood, with the completion on September 1, 1961 of a 3/4 mile section in Norwood, from East Cross Street to south of Dean Street.

This project provides a new median strip and eliminates dangerous left turns by providing two "jug handles" or turning roadways, on Route 1 at Dean Street. In the project were two bridges including one with an increased span over the Neponset River. The median strip will reduce head-on collisions along this part of Route 1 which has been highly developed by industry and commerce. Previously this section had a high accident rate.

Routes 9 and 32 in Ware

A little more than a mile of reconstructed Routes 9 and 32 in Ware was completed this Fall, improving a dangerous condition at the railroad underpass. The grade was lowered beneath the railroad bridge and the roadway was widened to 40 feet from a point north of the railroad to a point north of Knox Avenue.

The new section will better serve traffic between Ware and Gilbertville and Hardwick over Route 32 and points to the east on Route 9.

highway progress and urban renewal go hand in hand

The Department is studying design changes in the street pattern in downtown Boston to accommodate the traffic needs of the new Government Center and Lt. William F. Callahan, Jr. Tunnel in Boston.

Street patterns must be redesigned in two locations. One of these is beneath the John F. Fitzgerald Expressway in Boston, from Haymarket Square, to the Callahan Tunnel entrance. Surface roads will be improved to serve efficiently both the expected traffic at the new tunnel which opened on November 11, 1961 and traffic through the Boston redevelopment area.

The other location to be changed is in the area of the new State Office Building, bounded by Cambridge and Somerset Streets, Ashburton Place and Bowdoin Street. These four streets will be widened to boulevard proportions to provide easier traffic flow. After reconstruction the streets will revert to the City of Boston for maintenance.

Tri-level bridge in Braintree -- the only one of its kind in the Commonwealth. Top level is the Southeast Expressway, southbound. Second level is Route 128, westbound and the lowest level is Route 128, northbound, connecting with the Southeast Expressway and leading to Quincy and Boston.

CHAPTERS 90 AND 81

state aid to cities and towns for highway building

Section 34 of Chapter 90 of the General Laws provides for making some of the Highway Fund available for expenditure, under the direction of the Department of Public Works, for maintaining, repairing, improving and constructing municipal and county highways, together with matching funds which the municipality and county appropriates for said purpose.

In the distribution of State funds, the Department sets up a quota for each county, which is based on population, mileage of municipal ways and area; the formula currently being used gives a 40% weight to population, 40% to mileage and 20% weight to area. This formula is also used as a guide to determine the amount to be set up for each city or town.

Winter Street Waltham
valuable access road to Route 128 industries

Randolph Avenue, Milton road reconstruction.

.PTER 90

Normally, the Department contributes one-
.f the cost of construction on projects
gible for Chapter 90 participation with
h municipality and county contributing
-quarter of the cost. Maintenance allot-
ts are set up on a one-third basis; that
with the State, county and municipality
h paying one-third of the cost.

The Chapter 90 outlay for the period Octo-
1960 to October 1961, totals $16,637,829
h the Commonwealth's share being $3,103,822.

Chapter 81 of the General Laws provides for
expenditure of funds for the repair and im-
vement of public ways, other than State
hways, in towns having a valuation under
000,000 and a road mileage ratio of less than
lve.

The road mileage ratio is determined by
iding the proportionate part of the State tax
million by the number of miles of public
s, exclusive of State highways, in each town.
State appropriates $275.00 per mile and the
n contributes from $15.00 per mile as a mini-
to $150.00 per mile as a maximum based on
road mileage ratio.

There are 9554 miles of town ways located
182 towns eligible for Chapter 81 expendi-
es. The work consists of patching, widen-
, reshaping or surfacing with gravel or
er suitable material and also surface treat-
with bituminous materials.

The Chapter 81 program for the year 1961
unts to $3,458,580 with the Commonwealth's
re being $2,643,850.

New surface on Broadway, South Boston

Suburban scene on Sumner Street, Norwood

STATE AID CHAPTER 90 PROGRAM
SUMMARY OF PROJECTS IN PROGRESS - OCT. 1960 TO OCT. 1961

COUNTY	STATE FUNDS	TOWN FUNDS	COUNTY FUNDS	TOTAL FUNDS
BARNSTABLE	164,300	82,150	82,150	328,600
BERKSHIRE	313,950	149,575	153,575	617,100
BRISTOL	508,900	250,450	250,450	1,009,800
DUKES	87,500	25,750	35,750	149,000
ESSEX	733,300	366,650	366,650	1,466,600
FRANKLIN	357,550	196,400	160,750	714,700
HAMPDEN	511,000	258,500	260,500	1,030,000
HAMPSHIRE	278,750	136,675	138,975	554,400
MIDDLESEX	1,518,404	753,348	761,808	3,033,560
NANTUCKET	18,000	18,000	------	36,000
NORFOLK	576,350	288,175	288,175	1,152,700
PLYMOUTH	543,000	267,500	275,500	1,086,000
SUFFOLK	561,085	553,885	------	1,114,970
WORCESTER	1,438,800	719,400	719,400	2,877,600
STATE WIDE MAINTENANCE	492,933	500,933	472,933	1,466,799
TOTALS	8,103,822	4,567,391	3,966,616	16,637,829

BARNSTABLE COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
BOUREN	County Rd.	15,000	7,500	7,500	30,000
BREWSTER	Horwich Rd.	8,000	4,000	4,000	16,000
DENNIS	Upper County Rd.	13,000	6,500	6,500	26,000
EASTHAM	Hemenway Rd.	2,000	1,000	1,000	4,000
FALMOUTH	Dillingham Ave.	64,000	32,000	32,000	128,000
MASHPEE	Cotuit Rd.	16,000	8,000	8,000	32,000
SANDWICH	Beale Ave.	15,000	7,500	7,500	30,000
SANDWICH	Grove Ave.	1,800	900	900	3,600
TRURO	Kings Highway	9,500	4,750	4,750	19,000
WELLFLEET	Ocean View Drive	10,000	5,000	5,000	20,000
YARMOUTH	Union St.	10,000	5,000	5,000	20,000
	Totals	164,300	82,150	82,150	328,600

BERKSHIRE COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
ADAMS	East Hoosac St.	11,800	5,900	5,900	23,600
ALFORD	North Egremont Rd.	6,150	3,075	3,075	12,300
BECKET	Yokum Pond Rd.	9,000	4,500	4,500	18,000
CHESHIRE	Fales Rd.	7,600	3,800	3,800	15,200
CLARKSBURG	Middle Rd.	3,100	1,550	1,550	6,200
DALTON	South St.	13,500	6,750	6,750	27,000
EGREMONT	Creamery Rd.	5,000	2,500	2,500	10,000
FLORIDA	Tilda Hill Rd.	22,000	11,000	11,000	44,000
HANCOCK	Brodie Mt. Rd.	4,000	1,000	1,000	6,000
HINSDALE	Pittsfield Rd.	6,000	3,000	3,000	12,000
LANESBOROUGH	Bailey Rd.	9,000	4,500	4,500	18,000
LEE	East St.	25,000	12,500	12,500	50,000
LENOX	East & Housatonic Sts.	8,500	4,250	4,250	17,000
MONTEREY	Sandisfield Rd.	5,000	2,500	2,500	10,000
MT. WASHINGTON	East St.	3,000	1,500	1,500	6,000
NEW ASHFORD	Ingraham Rd.	1,000	500	500	2,000
NEW MARLBOROUGH	Norfolk Rd.	27,000	13,500	13,500	54,000

BERKSHIRE COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
NORTH ADAMS	Notch Rd.	19,000	9,500	9,500	38,000
OTIS	Reservoir & Hawley Rds.	10,000	5,000	5,000	20,000
PERU	South & East Windsor Rds.	5,000	2,500	2,500	10,000
PITTSFIELD	Peck's Rd.	23,000	11,500	11,500	46,000
RICHMOND	Swamp Rd.	11,200	5,600	5,600	22,400
SANDISFIELD	New Boston Rd.	12,000	6,000	6,000	24,000
SAVOY	Chapel & Center Rds.	8,000	4,000	4,000	16,000
STOCKBRIDGE	Glendale-Middle Rd.	6,100	3,050	3,050	12,200
TYRINGHAM	Main Rd.	4,800	2,000	2,000	8,800
WASHINGTON	Pittsfield Rd.	10,000	1,000	4,000	15,000
WEST STOCKBRIDGE	Cobb Rd.	11,200	5,600	5,600	22,400
WILLIAMSTOWN	Sloan Rd.	18,000	9,000	9,000	36,000
WINDSOR	River Rd.	9,000	2,500	3,500	15,000
	Totals	313,950	149,575	153,575	617,100

BRISTOL COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
DIGHTON	Elm St.	16,500	8,250	8,250	33,000
FALL RIVER	Durfee & Union Sts.	153,400	76,700	76,700	306,800
FALL RIVER	Weaver St. Bridge	9,000	4,500	4,500	18,000
FREETOWN	Locust St. Bridge	22,000	11,000	11,000	44,000
NEW BEDFORD	Church St.	140,000	70,000	70,000	280,000
NORTH ATTLEBORO	North & South Washington St. & Elm St.	49,500	24,750	24,750	99,000
RAYNHAM	Elm St.	18,000	9,000	9,000	36,000
REHOBOTH	Park St.	24,500	12,250	12,250	49,000
SEEKONK	Newman Ave.	32,000	16,000	16,000	64,000
SWANSEA	Maple St.	24,000	8,000	8,000	40,000
WESTPORT	Adamsville & Main Rds.	20,000	10,000	10,000	40,000
	Totals	508,900	250,450	250,450	1,009,800

DUKES COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
CHILMARK	Middle Rd.	9,000	4,500	4,500	18,000
EDGARTOWN	Herring Creek Rd.	13,500	6,750	6,750	27,000
GAY HEAD	Moshope Trail	36,000	----	10,000	46,000
OAK BLUFFS	Wing Rd.	8,000	4,000	4,000	16,000
TISBURY	Baggett Ave. & Lambert's Cove Rd.	9,000	4,500	4,500	18,000
WEST TISBURY	Lambert's Cove Rd.	12,000	6,000	6,000	24,000
	Total	87,500	25,750	35,750	149,000

ESSEX COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
AMESBURY	Whitehall Rd.	22,000	11,000	11,000	44,000
ANDOVER	Dascomb Rd. & High St.	29,000	14,500	14,500	58,000
BEVERLY	Cabot St., Conant St. & Bridge St.	31,000	15,500	15,500	62,000
BOXFORD	Washington St.	10,000	5,000	5,000	20,000
DANVERS	Sylvan & Poplar Sts.	36,000	18,000	18,000	72,000
ESSEX	Southern Ave.	4,750	2,375	2,375	9,500
GLOUCESTER	Nautilaus Rd., Main St. Middle St., Washington St. & Western Ave.	30,000	15,000	15,000	60,000
GROVELAND	School St.	11,000	5,500	5,500	22,000
HAMILTON	Bridge St. & Walnut Rd.	16,000	8,000	8,000	32,000
HAVERHILL	Concord, Main, Salem, Water, So.Main Sts. Oxford Ave., North Broadway, Camoille Ave. Lowell Ave., Washington St. River St., Blossom St., Bradford Ave., Memorial Ave., Fifth Ave., & Sixth Ave.	95,000	47,500	47,500	190,000
LAWRENCE	Swan St., Franklin St., Tremont St., Haverhill St. Carver St., Allston St., Cambridge St., Park St. Andover St., Essex St., Olive Ave., Broadway, West St., Holly St., Daisy St., Spruce St., Ames St., Yale St., Hillside Ave.	107,000	53,500	53,500	214,000

LYNN	Buffam St., Willow St. Range Ave., Saunders St., Harris Rd., Hanover St., Franklin St., Neptune St., Broad St., Hudson St., Lewis St., Union St., Forrest St., Brookline St., Safford St., Kirkland St., Atlantic St., New Ocean St., Eastern Ave., Millard Ave., Linwood Rd., & O'Callaghan Way	64,000	32,000	32,000	128,000
LYNNFIELD	Walnut St.	10,750	5,375	5,375	21,500
MANCHESTER	Lincoln St. & Upper Pine St.	5,000	2,500	2,500	10,000
MARBLEHEAD	Atlantic Ave., Pleasant St. Nanepashemit St. & West Shore Drive	31,000	15,500	15,500	62,000
MERRIMAC	River Rd.	12,000	6,000	6,000	24,000
METHUEN	Lowell St., Woodland St. Pleasant St., Cross St.& Railroad Square	56,000	28,000	28,000	112,000
MIDDLETON	Forrest St.	5,000	2,500	2,500	10,000
NAHANT	Spring Rd.	8,000	4,000	4,000	16,000
NEWBURY	Parker St.	12,000	6,000	6,000	24,000
NEWBURYPORT	Ferry Rd., Liberty St., Low St. & Parker St.	14,000	7,000	7,000	28,000
NORTH ANDOVER	Dale St.	16,000	8,000	8,000	32,000

ESSEX COUNTY (Cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
ROCKPORT	South St. Thatcher Rd.	6,000	3.000	3,000	12,000
ROWLEY	Haverhill St.	13,000	6,500	6,500	26,000
SALEM	Essex St. Federal St. Mason St. Dunlop St. Raymond Rd. Raymond Ave. Broadway Lindon St. & Salem St.	27,000	13,500	13,500	54,000
SALISBURY	Congress St. Railroad Ave. Ferry Rd. Folly-Mill Rd. Elmwoad St.	14,000	7,000	7,000	28,000
SAUGUS	Central St. Lincoln Ave. Woodbury Ave.	19,800	9,900	9,900	39,600
TOPSFIELD	Ipswich Rd.	16,000	8,000	8,000	32,000
WENHAM	Grapevine Rd.	8,000	4,000	4,000	16,000
WEST NEWBURY	Church St.	4,000	2,000	2,000	8,000
	Totals	733,300	366,650	366,650	1,466,600

FRANKLIN COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
ASHFIELD	Williamsburg Rd. Watson-Spruce Corner Cummington & Ludwig Rd.	18,000	9,000	9,000	36,000
BERNARDSTON	Eden Trail Branch Rd.	4,000	2,000	2,000	8,000
BUCKLAND	Bray Rd.	16,000	8,000	8,000	32,000
CHARLEMONT	South River Rd.	18,000	9,000	9,000	36,000
COLRAIN	Greenfield Rd.	8,000	4,000	4,000	16,000
CONWAY	Main Poland Rd. Shelburne Falls Rd. South Ashfield Rd. Bardswell Ferry Rd.	20,500	10,250	10,250	41,000
DEERFIELD	West Deerfield Upper Rd. Stillwater Bridge Rd.	5,200	2,600	2,600	10,400
ERVING	Mountain Rd.	20,500	10,250	10,250	41,000
GILL	West Gill Rd.	12,000	6,000	6,000	24,000
GREENFIELD	Leyden Rd.	42,000	34,000	8,000	84,000
HAWLEY	East Hawley Rd.	6,000	3,000	3,000	12,000
HEATH	Colrain Rd.	18,800	9,400	9,000	37,200
LEVERETT	Cave Hill & Montaque Rds.	9,000	4,500	4,500	18,000

FRANKLIN COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
LEYDEN	West Leyden Rd.	13,200	6,600	6,600	26,400
MONTAGUE	Old Greenfield Rd. South St. & Leverett Rd.	18,000	11,000	7,000	36,000
NEW SALEM	Elm St. & North Main St.	11,000	5,500	5,500	22,000
NORTHFIELD	Gulf Rd. & Warwick Ave.	22,500	11,250	11,250	45,000
ORANGE	West River St. & North Main St.	8,600	4,300	4,300	17,200
ORANGE	East River St. & North Orange Rd.	6,250	3,250	3,000	12,500
ROWE	Hazelton Rd.	15,000	10,000	5,000	30,000
SHELBURNE	Little Mohawk Rd. Colrain-Greenfield Rd. & Bardwells Ferry Rd.	17,000	8,500	8,500	34,000
SHUTESBURY	Leverett Rd. & West Pelham Rd.	7,000	3,500	3,500	14,000
SUNDERLAND	North Main St. & Montaque Rd.	12,200	6,100	6,100	24,400
WARWICK	Wendell Rd., Northfield Rd. & Athol Rd.	17,800	8,900	8,900	35,600
WENDELL	Miller Falls & Farley Rd.	5,000	2,500	2,500	10,000
WHATELY	River Rd.	6,000	3,000	3,000	12,000
	Totals	357,550	196,400	160,750	714,700

HAMPDEN COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
AGAWAM	North St. & Mill St.	19,000	9,500	9,500	38,000
BLANDFORD	North Blandford Rd.	8,000	2,500	4,500	15,000
BRIMFIELD	Monson Rd.	10,000	5,000	5,000	20,000
CHESTER	Middlefield Rd.	10,000	5,000	5,000	20,000
CHICOPEE	Carew St., Fuller Rd. & East Main St.	47,500	23,750	23,750	95,000
EAST LONGMEADOW	Shaker Rd. & Pleasant St.	8,500	4,250	4,250	17,000
GRANVILLE	Main Rd. & Old Westfield Rd.	27,500	13,750	13,750	55,000
HAMPDEN	Chapin Rd., South Monson Rd. & Main St.	13,000	6,500	6,500	26,000
HOLLAND	Stafford Rd.	9,000	4,500	4,500	18,000
HOLYOKE	South Hampton Rd.	12,500	6,250	6,250	25,000
HOLYOKE	South St. Bridge	51,000	25,500	25,500	102,000
LONGMEADOW	Maple Road	11,000	5,500	5,500	22,000
LUDLOW	East St., West St. Plumley St.	12,400	6,200	6,200	24,800
MONSON	Hampden Upper Rd.	35,000	17,500	17,500	70,000
MONTGOMERY	Carrington Rd.	4,000	2,000	2,000	8,000
PALMER	Shearer St.	14,500	7,250	7,250	29,000
RUSSELL	Dickenson-Hill Rd.	4,000	2,000	2,000	8,000

HAMPDEN COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
SOUTHWICK	Granville Rd.	24,100	12,050	12,050	48,200
SPRINGFIELD	Chestnut St. & Springfield St.	90,000	45,000	45,000	180,000
TOLLAND	New Boston Rd.	10,000	5,000	5,000	20,000
WALES	Hollow Rd. & McBride Rd.	8,000	4,000	4,000	16,000
WESTFIELD	Union St.	30,000	15,000	15,000	60,000
WEST SPRINGFIELD	Pease Ave. Dewey St. & Amos Town Rd.	33,000	16,500	16,500	66,000
WEST SPRINGFIELD	Bridge Maintenance	9,000	9,000	9,000	27,000
WILBRAHAM	Monson Rd.	10,000	5,000	5,000	20,000
	Totals	511,000	258,500	260,500	1,030,000

HAMPSHIRE COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
AMHERST	North & South Pleasant St.	26,000	13,000	13,000	52,000
BELCHERTOWN	Turkey Hill Road	19,000	8,000	9,500	36,500
BELCHERTOWN	Bay Road	2,000	1,000	1,000	4,000
CHESTERFIELD	Bisbee Rd. Bridge	8,000	3,000	3,000	14,000
CHESTERFIELD	Cummington & Roberts Meadow Rd.	13,500	6,750	6,750	27,000
CUMMINGTON	West Cummington Rd.	10,000	5,000	5,000	20,000
EAST HAMPTON	Florence Rd. & Main St.	32,000	16,000	16,000	64,000
EAST HAMPTON	South Main St.	18,000	9,000	9,000	36,000
GOSHEN	Sears Rd.	4,000	2,000	2,000	8,000
GRANBY	Amherst St.	9,500	4,750	4,750	19,000
HADLEY	Bay Rd.	10,000	5,000	5,000	20,000
HATFIELD	North Main St.	10,400	5,200	5,200	20,800
HUNTINGTON	Blandford Rd.	6,000	3,000	3,000	12,000
MIDDLEFIELD	East River Rd. & Town Hill Rd.	5,000	2,500	2,500	10,000
PELHAM	Buffam Rd.	4,000	2,000	2,000	8,000

HAMPSHIRE COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
PLAINFIELD	Gloyd Rd.	5,800	2,700	3,500	12,000
SOUTH HADLEY	Hockanum Rd.	12,550	6,275	6,275	25,100
SOUTHAMPTON	Fomer Rd.	10,000	5,000	5,000	20,000
WARE	North St. & South St.	27,500	13,750	13,750	55,000
WARE	Main St.	5,000	2,500	2,500	10,000
WESTHAMPTON	Main Rd.	5,000	2,500	2,500	10,000
WILLIAMSBURG	Ashfield Rd. & Mountain St.	17,500	8,750	8,750	35,000
WORTHINGTON	Old Post Rd.	18,000	9,000	9,000	36,000
	Totals	278,750	136,675	138,975	554,400

MIDDLESEX COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
ACTON	Powder Mill Rd.	26,000	13,000	13,000	52,000
ACTON	Main St.	11,900	5,950	5,950	23,800
ARLINGTON	Mass. Ave. & Park Ave.	35,000	17,500	17,500	70,000
ARLINGTON	Mystic St.	43,000	21,500	21,500	86,000
ASHBY	South Rd.	9,000	3,000	6,000	18,000
ASHLAND	Fruit & Eliot Sts.	16,900	8,450	8,450	33,800
AYER	Old Groton Rd.	11,300	5,650	5,650	22,600
BELMONT	Trapelo Rd.	48,000	24,000	24,000	96,000
BOXBOROUGH	Codman Hill Rd. & Liberty Square Rd.	7,380	2,460	4,920	14,760
BURLINGTON	Winn St.	7,600	3,800	3,800	15,200
CAMBRIDGE	Halworthy St., Quincy St., Monroe St., Vassar St., & Belmont St.	60,000	30,000	30,000	120,000
CARLISLE	East St.	5,000	2,500	2,500	10,000
CHELMSFORD	Concord Road	19,000	9,500	9,500	38,000
CONCORD	Thoreau St.	18,500	9,250	9,250	37,000
DRACUT	Mammouth Rd.	35,100	17,550	17,550	70,200
DUNSTABLE	Main St.	9,000	3,000	6,000	18,000

MIDDLESEX COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
EVERETT	Tileston St., Second St., Third St., Springvale Ave. & Broadway	30,000	15,000	15,000	60,000
FRAMINGHAM	Elm St., Concord St., Water St. & Central St.	37,500	18,750	18,750	75,000
GROTON	West Groton Rd.	13,000	6,500	6,500	26,000
HOLLISTON	Fiske St.	8,000	4,000	4,000	16,000
HOPKINTON	Cedar St. & South St.	26,000	13,000	13,000	52,000
HUDSON	Cox Street	12,000	6,000	6,000	24,000
LEXINGTON	Concord Ave., Winchester Dr., Maple St. & Lowell St.	20,000	10,000	10,000	40,000
LEXINGTON	Concord Ave., Winchester Dr.	40,700	20,350	20,350	81,400
LINCOLN	Concord Road	7,000	3,500	3,500	14,000
LITTLETON	Goldsmith St., Newtowne Rd. & Taylor St.	15,500	7,750	7,750	31,000
LOWELL	Merrimac St., Westford St., Chelmsford St., Concord St., Carlisle St., Appleton St., Pawtucket St., Gorham St., & Pleasant St.	64,000	32,000	32,000	128,000
LOWELL	Varnum Ave., Andover St., Douglas Rd.	78,100	39,050	39,050	156,200

MIDDLESEX COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
MALDEN	Forest St., Washington St. & Ferry St.	22,000	11,000	11,000	44,000
MARLBOROUGH	Stirrup Brook Parkway	60,700	30,350	30,350	121,400
MAYNARD	Parker St.	1,800	900	900	3,600
MEDFORD	College Ave., Woburn St., Magoun Ave.	36,000	18,000	18,000	72,000
MELROSE	Main St.	25,500	12,750	12,750	51,000
NATICK	Speen St., Oak St. & Commonwealth Rd.	17,500	8,750	8,750	35,000
NEWTON	Dedham St.	71,500	35,750	35,750	143,000
NORTH READING	Concord St.	17,300	8,650	8,650	34,600
PEPPERELL	Dunstable Rd.	22,600	11,300	11,300	45,200
READING	West St.	15,000	7,500	7,500	30,000
SHERBORN	Main St.	13,600	6,800	6,800	27,200
SHIRLEY	Leominster & Harvard Rds.	6,800	3,400	3,400	13,600
SOMERVILLE	Morrison Ave., Willow Ave., Bonner Ave., Grove St., Crocker St., Newton St., South St., Merriam St., Otis St., Power St., Preston Rd.	72,624	34,688	34,688	142,000

MIDDLESEX COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
STONEHAM	Perkins & Spring Sts.	24,800	12,400	12,400	49,600
STOW	South Acton Rd., Great Rd. & Gleasondale Rd.	14,500	7,250	7,250	29,000
SUDBURY	Maynard Rd.	24,600	12,300	12,300	49,200
TEWKSBURY	Shawsheen St.	33,300	16,650	16,650	66,600
TOWNSEND	New Fitchburg Rd.	12,000	6,000	6,000	24,000
TYNGSBOROUGH	Long Pond Rd.	15,700	7,850	7,850	31,400
WAKEFIELD	Water St. & North St.	17,000	8,500	8,500	34,000
WALTHAM	Winter St. (New Way)	110,400	55,200	55,200	220,800
WATERTOWN	Mt. Auburn St., Bridge St., Watertown Square	40,000	20,000	20,000	80,000
WATERTOWN	Waverly Ave.	12,000	6,000	6,000	24,000
WAYLAND	Commonwealth Rd.	10,000	5,000	5,000	20,000
WESTFORD	Concord R. & Carlisle Rd.	31,200	15,600	15,600	62,400
WESTON	Wellesley St. & North Ave.	10,000	5,000	5,000	20,000
WILMINGTON	Concord St. & Federal St.	23,500	11,750	11,750	47,000
WINCHESTER	Ridge Street	19,000	9,500	9,500	38,000
WOBURN	Olympia Ave.	23,000	11,500	11,500	46,000
	Totals	1,518,404	753,348	761,808	3,033,560

NANTUCKET COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
NANTUCKET	Cliff Road	18,000	18,000	----	36,000
	Totals	18,000	18,000	----	36,000

NORFOLK COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
AVON	Page St.	7,000	3,500	3,500	14,000
BELLINGHAM	South Main St.	23,000	11,500	11,500	46,000
BRAINTREE	Union St.	90,100	45,050	45,050	180,200
CANTON	Randolph St.	33,700	16,850	16,850	67,400
COHASSET	Forest Ave.	8,000	4,000	4,000	16,000
DEDHAM	Cedar St. Bridge	53,000	26,500	26,500	106,000
FOXBOROUGH	East St. & Oak St.	10,000	5,000	5,000	20,000
FRANKLIN	Grove St.	16,000	8,000	8,000	32,000
HOLBROOK	Pine St.	9,500	4,750	4,750	19,000
MEDFIELD	Spring St., High St. & South St.	8,000	4,000	4,000	16,000
MEDWAY	Winthrop St.	11,000	5,500	5,500	22,000
MILTON	Randolph Ave.	38,000	19,000	19,000	76,000
NEEDHAM	Central Ave. & Great Plain Ave.	30,000	15,000	15,000	60,000
NORFOLK	Park St. & Lawrence St.	6,000	3,000	3,000	12,000
NORWOOD	Sumner St.	29,000	14,500	14,500	58,000
SHARON	Bay Road	11,000	5,500	5,500	22,00

NORFOLK COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
STOUGHTON	Central St.	27,000	13,500	13,500	54,000
WALPOLE	Washington St.	2,250	1,125	1,125	4,500
WELLESLEY	Washington St. & Grove St.	49,000	24,500	24,500	98,000
WESTWOOD	High St.	12,400	6,200	6,200	24,800
WEYMOUTH	Commercial St. & Pleasant St.	88,000	44,000	44,000	176,000
WRENTHAM	Shears St.	14,400	7,200	7,200	28,800
	Totals	576,350	288,175	288,175	1,152,700

SUFFOLK COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
BOSTON	West Broadway	23,000	23,000	----	46,000
BOSTON	West St. River St. Fairmount Ave.	45,000	45,000	----	90,000
BOSTON	Centre St.	55,000	55,000	----	110,000
BOSTON	Bennington St.	124,000	124,000	----	248,000
BOSTON	Commonewalth Ave.	203,400	203,400	----	406,800
BOSTON	Baker St.	22,500	22,500	----	45,000
BOSTON	Beacon St..	28,500	28,500	----	57,000
CHELSEA	Chelsea Square	2,585	2,585	----	5,170
REVERE	Winthrop Ave. & Mills Ave.	21,000	21,000	----	42,000
REVERE	Washington Ave.	8,100	900	----	9,000
WINTHROP	Cliff Ave.	10,000	10,000	----	20,000
WINTHROP	Cross St. & Shirley St.	18,000	18,000	----	36,000
	Totals	561,085	553,885	----	1,114,970

PLYMOUTH COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
ABINGTON	Adams St. Groveland St. & Thicket St.	20,000	10,000	10,000	40,000
BRIDGEWATER	Pleasant St.	12,000	6,000	6,000	24,000
BROCKTON	Sumner St.,Pleasant St., & Oak St.	50,000	25,000	25,000	100,000
CARVER	Main St.	22,000	11,000	11,000	44,000
CARVER	Tremont St.	4,000	2,000	2,000	8,000
DUXBURY	Franklin St.	12,000	6,000	6,000	24,000
EAST BRIDGEWATER	Highland St.	11,000	5,500	5,500	22,000
HALIFAX	Plymouth St. & Pond St.	18,000	9,000	9,000	36,000
HANOVER	Elm St. & Water St.	17,000	8,500	8,500	34,000
HANSON	Main St.	10,000	5,000	5,000	20,000
HANSON	Indian Head St.	10,000	5,000	5,000	20,000
HINGHAM	Cushing St.,Ward St. & Main St.	17,500	8,750	8,750	35,000
HULL	Central Ave	8,000	4,000	4,000	16,000
KINGSTON	Lake St.	12,000	6,000	6,000	24,000
LAKEVILLE	Mill St. & Malbone St.	22,000	11,000	11,000	44,000

PLYMOUTH COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
MARION	Front St. & Point Rd.	13,000	6,500	6,500	26,000
MARSHFIELD	Ocean St.	31,000	15,500	15,500	62,000
MATTAPOISETT	Aucoot Rd. & Neck Rd.	6,000	3,000	3,000	12,000
MIDDLEBOROUGH	North Main St., North St. & Coombs St.	25,000	12,500	12,500	50,000
NORWELL	Main St.	22,000	11,000	11,000	44,000
PEMBROKE	Oldham St. & School St.	21,000	10,500	10,500	42,000
PLYMOUTH	Beaver Dam Rd. & Clark Rd.	35,000	17,500	17,500	70,000
PLYMOUTH	County Road	16,000	4,000	12,000	32,000
ROCHESTER	New Bedford Rd. & Neck Rd.	23,000	11,500	11,500	46,000
ROCKLAND	Plain Rd.	20,000	10,000	10,000	40,000
SCITUATE	Kent St. & Driftway Rd.	23,000	11,500	11,500	46,000
WAREHAM	Gibbs Ave. & Cromeset Road	34,000	17,000	17,000	68,000
WEST BRIDGEWATER	South St.	9,500	4,750	4,750	19,000
WHITMAN	Auburn St. & Plymouth St.	19,000	9,500	9,500	38,000
	Totals	543,000	267,500	275,500	1,086,000

WORCESTER COUNTY

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
ASHBURNHAM	Lake St.& Main St.	16,000	8,000	8,000	32,000
ATHOL	West Royalston Rd. & Silver Lake St.	39,000	19,500	19,500	78,000
AUBURN	Millbury St. & Auburn St.	52,600	26,300	26,300	105,200
BARRE	South St.	15,000	7,500	7,500	30,000
BARRE	Williamsville Rd.	11,000	5,500	5,500	22,000
BERLIN	Whitney St. & River Rd.	4,000	2,000	2,000	8,000
BLACKSTONE	Federal St.	8,400	4,200	4,200	16,800
BOLTON	Wattquadock Rd & Harvard Rd.	12,000	6,000	6,000	24,000
BOYLSTON	Central St.	12,000	6,000	6,000	24,000
BROOKFIELD	Quaboag Rd.	8,000	4,000	4,000	16,000
BROOKFIELD	Rice Corner Rd.	10,000	5,000	5,000	20,000
CHARLTON	Northside Turnpike	22,000	11,000	11,000	44,000
CLINTON	Water St.	14,500	7,250	7,250	29,000
DOUGLAS	Gilboa St.	12,000	6,000	6,000	24,000
DUDLEY	Oxford Ave.	23,400	11,700	11,700	46,800
EAST BROOKFIELD	North St.	7,000	3,500	3,500	14,000
FITCHBURG	Electric Ave.	14,000	7,000	7,000	28,000
FITCHBURG	John Fitch Highway	36,000	18,000	18,000	72,000

WORCESTER COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
GARDNER	Parker St. Central St. & Pearl St.	42,000	21,000	21,000	84,000
GRAFTON	Milford St.	20,000	10,000	10,000	40,000
HARDWICK	Lower Road	26,000	13,000	13,000	52,000
HARVARD	Lancaster County Rd	6,000	3,000	3,000	12,000
HARVARD	Still River Road	6,000	3,000	3,000	12,000
HOLDEN	Salisbury St.	31,000	15,500	15,500	62,000
HOLDEN	Malden St.	19,000	9,500	9,500	38,000
HUBBARDSTON	New Westminster Rd.	11,000	5,500	5,500	22,000
LANCASTER	Main St.	21,000	10,500	10,500	42,000
LEICESTER	Pleasant St. & Stafford St.	56,900	28,450	28,450	113,800
LEOMINSTER	Main St.	30,000	15,000	15,000	60,000
LEOMINSTER	Mechanic St.	20,000	10,000	10,000	40,000
LUNENBURG	White St. & Pleasant St.	16,500	8,250	8,250	33,000
MENDON	North Ave.	13,000	6,500	6,500	26,000
MILFORD	Main St. & Congress St.	43,000	21,500	21,500	86,000
MILLBURY	West Main St.	19,500	9,750	9,750	39,000
NEW BRAINTREE	Worcester Rd. & Ravine Rd.	14,000	7,000	7,000	28,000
NORTHBOROUGH	Whitney St. Bartlett St. & Cedar Hill St.	19,500	9,750	9,750	39,000
NORTHBRIDGE	Riverdale St. & Quaker St.	9,000	4,500	4,500	18,000

WORCESTER COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
NORTHBRIDGE	Church St.	2,000	1,000	1,000	4,000
OAKHAM	Spencer Rd & New Braintree Rd.	12,000	6,000	6,000	24,000
OXFORD	Joe Jenney Road	20,000	10,000	10,000	40,000
PAXTON	West St.	5,000	2,500	2,500	10,000
PETERSHAM	East St.	4,000	2,000	2,000	8,000
PHILLIPSTON	Barre Road	8,000	4,000	4,000	16,000
PRINCETON	Worcester Road	6,000	3,000	3,000	12,000
PRINCETON	Brook Station Road	6,000	3,000	3,000	12,000
ROYALSTON	North Fitzwilliam Rd. & Winchendon Rd.	16,000	8,000	8,000	32,000
RUTLAND	Wachusetts St.	9,000	4,500	4,500	18,000
SOUTHBOROUGH	Framingham Road	14,000	7,000	7,000	28,000
SOUTHBRIDGE	Pleasant St.	43,000	21,500	21,500	86,000
SPENCER	Meadow Road	22,000	11,000	11,000	44,000
STERLING	John Dee Road	19,200	9,600	9,600	38,400
STURBRIDGE	Holland Road & Church St.	10,000	5,000	5,000	20,000
STURBRIDGE	Holland Rd. & Whittemore Road	12,000	6,000	6,000	24,000
SUTTON	Whitin Road	21,000	10,500	10,500	42,000
TEMPLETON	Otter River Road	22,000	11,000	11,000	44,000
UPTON	Pleasant St.	9,000	4,500	4,500	18,000

WORCESTER COUNTY (cont'd)

TOWN	ROAD	STATE	TOWN	COUNTY	TOTAL
UXBRIDGE	Douglas St. & Hartford Ave.	11,000	5,500	5,500	22,000
UXBRIDGE	Hartford Ave East	11,500	5,750	5,750	23,000
WARREN	Southbridge Road	20,000	10,000	10,000	40,000
WEBSTER	Lake Street	28,000	14,000	14,000	56,000
WEST BOYLSTON	Laurel Street & Beaman St.	18,000	9,000	9,000	36,000
WEST BROOKFIELD	Snow Rd.	10,000	5,000	5,000	20,000
WESTBOROUGH	Lyman St.	25,500	12,750	12,750	51,000
WESTBOROUGH	Church St. Fisher St. & Milk St.	7,000	3,500	3,500	14,000
WESTMINSTER	Ellis Rd. & Nichols Rd.	11,300	5,650	5,650	22,600
WESTMINSTER	North Commen Road	18,000	9,000	9,000	36,000
WINCHENDON	Brown St. Bridge	30,000	15,000	15,000	60,000
WORCESTER	Millbury St. & Greenwood Street	128,000	64,000	64,000	256,000
WORCESTER	Massasoit Road	120,000	60,000	60,000	240,000
	Totals	1,438,800	719,400	719,400	2,877,600

Pleasant country vista along modern, high-speed Interstate Route 93.

Roadside rest areas on major routes reduce dangers of driver fatigue

OTHER DEPARTMENT ACTIVITIES

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Proper signing of highways is important safety factor

Ingenious spray boom designed to utilize grass inhibitor

Bridges form integral part
of modern expressway system

During the period from November 1, 1960 to October 31, 1961, the Department advertised for bids for 95 new structures, which included 7 retaining walls; and for alterations or repairs to 7 structures. These structures were in 47 cities and towns and the total bid price for this work amounted to approximately $28,000,000.

Twenty of these bridges are on Interstate routes with 12 being on I-495 in Chelmsford, Haverhill, Lowell and Tewksbury.

The two bridges on I-195 are located in Fall River, one on the extension of Durfee Street over I-195 and the Quequechan River, and the second, which is 5780 feet long, is over the Taunton River between Fall River and Somerset. The bid for the superstructure for this latter bridge amounted to approximately $12,500,000.

The other bridges on the Interstate System are located on I-91 in Greenfield and Springfield and I-290 in Worcester.

Twenty-two bridges and one retaining wall were advertised for bids for the widening of Route 128 in Burlington, Lexington, Newton, Wellesley, Weston and Woburn.

The relocation of Route 2 in Gardner and Westminster accounted for 11 bridges and 6 retaining walls. Nine bridges were advertised for the relocation of Route 3 in Hanover, Norwell and Pembroke, and four bridges in Lanesborough for the relocation of Route 7.

Five bridges in connection with the Army Flood Control projects in Southbridge-Sturbridge area were advertised for bids.

Major reconstruction of the Fairhaven-New Bedford bridge on Route 6 over the Acushnet River was advertised with the low bid price being about $800,000.

Chapter 90 bridges and bridges on secondary roads account for the remainder of the structures advertised for bids during the period of this report.

The Department also made preliminary studies and initiated work on bridges to be advertised for bids in the near future as follows:

I-91 in Greenfield and Deerfield
I-95 in Canton, Foxborough and Sharon
I-195 in New Bedford
I-495 in Marlborough, Southborough and Westborough
I-290 in Worcester
relocation of Route 3 in Duxbury and Marshfield

Boring bids were advertised for 14 projects that included approximately 95 bridge sites.

MAINTENANCE DIVISION

The Maintenance Division is responsible for the physical maintenance and certain traffic services of 2,425 lineal miles of state highway and 1,827 bridges.

The present total of 2,425 lineal miles represents a total of 7,389 lane miles as compared to 6,943 lane miles in 1960.

Maintenance personnel figured prominently in three conferences held in 1961. On April 6, a Maintenance Conference was held at 100 Nashua Street with maintenance engineering personnel and foremen from all Districts present. Papers were presented on snow and ice control, structures and highway maintenance, contract and roadside development.

On May 24, the Department marked National Highway Week with a conference attended by highway officials from the municipalities and counties. Here again, maintenance subjects were emphasized and papers were read by men of the Division. On October 25, maintenance personnel led a roundtable discussion at a highway conference at the University of Massachusetts.

HIGHWAY SECTION

In the Highway Section, there were 15 resurfacing projects completed in fiscal year 1961. Seventeen miles of state highway were improved at a cost of $635,234.76.

There were 41 highway betterment projects completed. These included 30 force account projects at a total cost of $56,633 and 11 contract projects at a total cost of $102,948.

The type of work in these projects includes drainage, sidewalk preparation, guard rail, shoulder hardening and ledge removal. State highways in 35 different towns in the Commonwealth were included in the maintenance improvements.

Contract and ordinary maintenance work completed included a heater planer contract for $39,135.00, and five highway guard restoration projects totaling $17,109.00.

Three projects were completed under the Special Maintenance Program totaling $7,946.00. These projects consisted of sidewalk construction at a district highway building, heat installation for a foreman's garage and repairing roof expansion joints on the Wellesley Depot Building.

There were three new developments in the Highway Section:

1. The infra red road surface heater planer: A demonstration was made available on the surface of a bridge over the Charles River on Route 128 in Dedham-Needham. Heat is applied to the area that requires reshaping. The material is raked into proper section and rolled. It appears that there is a use for these heaters in highway surface work.
2. Bituminous concrete with tar for the cementing agent: An experimental section was laid on Route 1, Sharon and Wrentham. Evaluation of this will be developed later.
3. Polymer added to bituminous concrete Type I-1:

The thin overlay surface treatment of dense bituminous concrete which was reported last year has been increased in use so that this year about 50% of the program was by this method.

During the year, 117.32 miles of surface treatment work was scheduled on 74 projects. Twenty-eight projects called for liquid application and 46 projects called for treatment with bituminous concrete surface treatment mix.

In the fall of 1961, the Snow and Ice Control Engineer held conferences in each District. These conferences were with the District engineering personnel, the highway maintenance foremen, and highway repair foremen.

At these conferences, the duties of the various engineers and foremen were discussed as well as all phases of snow and ice control.

Due to the success of the experiment conducted in District 3 the previous winter on the use of chloride mixtures, all other Districts were instructed to increase the use of calcium chloride as an admixture to sodium chloride. This was discussed at great length with the District personnel and excellent results were obtained. It is planned to increase the use of chloride mixtures each year. This mixture is another tool for the use of our Snow and Ice Control Organization.

The winter of 1960-1961 proved that the Snow and Ice Control Organization can cope with all types of storms. During the past winter up to 120 inches of snow fell in some sections of the state. There were 3 major storms and 19 minor storms during the winter. Two of the major storms were classified as blizzards each leaving up to 24 inches of snow on the ground.

In spite of these blizzards, all of the state highways were kept open to traffic and within 24 hours after the storm was over vehicles could travel the posted speed limit on most state highways. In a few instances, some ramps at interchanges were closed due to stalled cars.

It was found that our new snow blowers are very valuable pieces of equipment. During the blizzard in February 1961, these snow blowers worked 16 hours a day for 8 days, widening the highways in all sections of the state.

During this past winter, 7,258 lane miles of State highway (2,425 linear miles) were plowed and sanded and 494 miles of town road were plowed under the cooperative plowing program.

The following quantities of materials were used in keeping the pavements clear of snow and ice:

sand	237,900 tons
sodium chloride	67,000 tons
calcium chloride	4,940 tons

The quantity of sand used was reduced approximately 136,000 tons over the previous year, while the sodium chloride was increased by approximately 20,000 tons and the calcium chloride was increased by approximately 2,400 tons. The extra cost of materials is more than offset by the fact that less equipment is used for spreading the chlorides and the cost of spring cleanup is reduced.

2,145 pieces of hired equipment were registered with the Department to augment the state owned equipment for snow and ice control; most of this equipment was used during the major storms.

To clean the highways of winter sand, the Department let 21 contracts for sand pickup. These were mostly on the major routes. 239 miles of highway were cleaned at an average cost of $723.00 per mile. Also, there were 33 contracts for cleaning 32,791 catch basins at an average cost of $2.94 each.

The approximate overall cost of snow and ice control for the 1960-1961 winter was $8,000,000.

During the past year, the Snow and Ice Control Engineer was assigned the additional duty of purchasing Federal Government surplus property for the Department's use. This material is purchased through the U.S. Bureau of Public Roads for 10% to 35% of the acquisition cost to the U.S. Government depending upon the condition of the equipment or material. A total of $56,384.20 worth of equipment was purchased at a cost to the Department of only $16,694.03.

BRIDGE MAINTENANCE

The total number of bridges maintained by this section on July 1, 1961 was 1,327, representing 1,767,000 square yards, an increase of 159,000 square yards over the previous year.

A new drawbridge was accepted for maintenance and operation over the East Branch of the Westport River on Horseneck Beach Road. Another drawbridge on Granite Avenue between Milton and Boston was accepted in the Fall of 1961.

One research project was done which consisted of placing a latex modified mortar surface on a bridge over Route 3 in Chelmsford. A final evaluation of this material has not yet been made.

ROADSIDE DEVELOPMENT

Contract activities carried on under the Maintenance Division Roadside Development Section consisted of tree removal, tree trimming, tree planting, D.D.T. mist blower and aerial spraying and hydraulic soil sterilant and custom spraying, roadside spraying and fertilization and grass mowing as follows:

Tree Removal

2,256 dead, dangerous and/or diseased trees were removed under contract from all state highways.

Tree Trimming

Maintenance trimming of all trees along 126 miles of state highway roadsides was accomplished under eight contracts. The trimming procedures, under Department contract specifications, require the removal of only that wood which is detrimental to the longevity of the tree or dangerous to the highway users.

Hurricane Tree Damage

Hurricane "Donna" of September 12, 1960 caused considerable tree damage on the Cape and the southeast coastal areas of Massachusetts. Department tree crews were active clearing trees and limbs from highways and trimming and removing trees which represented an immediate and serious hazard to the traveling public. The tree damage not of an immediate dangerous nature, was cleaned up under contract.

It is interesting to note that state highway trees suffered a minimum amount of damage under a storm of this intensity, attesting to the sound principals of annual tree maintenance as carried out under the Department's tree trimming and tree removal programs.

Tree Planting

The planting of 1,864 hardwood, shade and flowering trees and 19,700 evergreen seedlings on various state highway locations throughout the state was accomplished under eight contracts. This annual program is designed to offset storm damage, diseased, and normal tree losses by replacing in part those losses with a variety of tree species which will perpetuate our New England landscape.

Mowing

Contract mowing of all but 40 miles of state highway was accomplished under 83 contracts at a total cost of $548,594.51.

The two sections totaling 40 miles of highway, normally mowed under contract, were mowed this year by force account methods for a comparative cost study.

Soil Sterilant & Custom Hydraulic Spraying

Hydraulic soil sterilant spraying for the elimination of all vegetative growth adjacent to and under approximately 270 miles of guard rail was carried on in all Districts. This program eliminates the necessity of hand trimming of grass at treated guard rail locations for a minimum period of two years and represents a substantial savings in contract mowing costs.

Coupled with this work is the custom hydraulic spraying for the eradication of poison ivy, undesirable brush and obnoxious hard-to-kill weed growths by the use of low volatile ester brush killer chemicals 2,4-D and 2,4,5-T.

Combining these two operations in each of seven contracts substantially reduces the cost of application by making it possible for the contractors to use the same equipment with slight modification, for both the early spring soil sterilant spray and the midsummer custom hydraulic spray.

Roadside Chemical and Fertilization Spray

Work accomplished under this operation consists of the eradication of obnoxious and unsightly succulent weed growth from maintained turf areas through the use of chemical selective herbicide 2,4-D and the chemical fertilization of certain turf areas requiring rejuvenation with the use of "Urea" (45% nitrogen).

Combining these two applications in each of eight contracts, as has been done for the past two years, is another example of this Department's efforts in utilizing modern agricultural chemicals and application methods in order to reduce the cost of roadside maintenance without lowering this state's high standard of highway maintenance.

The economical advantages of this combined operation are: elimination of separate application costs, elimination of weed growth thereby providing a more suitable-appearing turf requiring fewer mowings than untreated areas and the fertilization of weak turf areas stimulating grass regrowth at a far less cost than would be involved in preparing for reseeding.

D.D.T. Mist Blower and Helicopter Aerial Spraying

Spraying of elm trees on state highway layout for the control of the Dutch Elm Disease was accomplished under seven mist blower contracts, one in each district and one state-wide helicopter aerial spray contract on selected wide layout areas throughout the state. Each contract requires the contractor to furnish (under Department specification) and apply 12% D.D.T. for a dormant spray application in the early spring for control of the Elm Bark Beetle and 6% D.D.T. for a foliage spray application in mid-summer for the control of the Elm Leaf Beetle.

Preventive Roadside Maintenance Planting.

The master plan for developing preventive maintenance and safety in the 16,000 acres of land that border the 2,425 miles of state highway, which began a few years ago, is being followed through the mulching and planting of many areas throughout the state with over 50 species of hardy seedlings, shrubs, ground covers, natural growth sods and trees.

The primary purpose of this planting and mulching program is to effect economy of highway maintenance. Through this planting, tremendous grass areas which normally would require repeated mowing throughout each season are being reverted to landscaped or natural growth areas, thereby eliminating the annual expense of mowing and other types of maintenance. Certain areas adjacent to native woodlands are being treated with woody mulch only, for the prevention of erosion while encouraging the establishment of natural growth within the area.

Safety is another major factor to be considered in the design of this roadside planting program. Planting must never be allowed to interfere with the safe sight distance of the highway user, but rather be designed to contribute to his safety through such functions as reducing oncoming headlight glare; serving as a guide on curves, around rotaries and at grade separation ramps; and in general relieving the roadside monotony, which so often induces driver fatigue and self-hypnosis.

Beautification of our highways, in itself a secondary consideration under this program, is being achieved by following sound landscape practices in the design of all work being carried on.

Beyond effecting economy of maintenance, contributing to highway safety and adding beauty to our roadsides, the program will add in future years tremendous areas devoted to the conservation of our natural resources; attract a greater number of tourists, who now spend $400,000,000 a year in Massachusetts; and create a heritage for future generations to enjoy.

In keeping with this approach to modern highway maintenance "Secondary Roadside Development Contracts" are now being let on all new construction projects, calling for the completion of all necessary roadside seeding, mulching and planting, so that the Commonwealth procures a COMPLETE HIGHWAY requiring minimum maintenance for years to come.

Growth Inhibitor Maleic Hydrazide (M.H.30)

In 1960, the chemical industry introduced a greatly improved formulation of maleic hydrazide identified as M.H.30 and research was undertaken in an effort to reduce our present grass mowing costs.

Approximately 75 acres embracing all types of grassed terrain were treated in the Springfield area. In addition, eight miles of median strips, roadsides and large bowl areas in various sections of the state were treated. This large scale experiment indicated that this improved material itself will produce a satisfactory degree of reduced growth rate to the grass but that considerable improvement had to be made in application equipment.

As a result, this Department has treated 65 miles of grassed areas along Route 9 from Brookline to Worcester and along Route 128 from Wellesley to Westwood.

Contract Travel Trash Collection

The Department of Public Works took another forward step in its continuing effort for the greatest possible economy in highway maintenance on May 13, 1961 when for the first time it advertised for bids on four projects calling for the collection and disposal of travel trash on a contract basis.

These pilot trash collecting contracts were, applied to a total of 106.8 miles of state highway located in the Cape Cod and southeastern areas of Massachusetts where summer travel is normally very heavy. Within the described limits of these contracts are approximately 222 travel trash barrels located at rest areas, truck turnouts and other locations along the roadsides, which must be serviced 90 times, as directed, within a period between late Spring and early Fall. The Department reserves the right to transfer barrels or to increase the number to be serviced by 10% within project limits as varying usage may indicate without additional compensation to the contractor.

Pilot contracts average 25 miles in length, include an average of 55 barrels and require a total of 90 units of complete collection and satisfactory disposal of travel trash during the summer season.

Each unit of collection and disposal, as directed by the Department, consists of collecting trash from and cleaning a ten-foot area around all barrels within the described limits of the contract area.

Sealed, competitive bids, publicly opened on May 31, 1961, averaged 18 bidders for each of the four projects, indicating a tremendous interest in this type of maintenance contract work.

Low bids received resulted in a price of $33.62 per unit of collection or $1.34 per collection per mile. This figure may be further projected to represent a SEASONAL cost for travel trash collection of $121.06 per mile of highway. Prices received are considered to be very favorable.

Following a complete season of operation under these pilot contracts, review of results will determine the Department's future efforts in establishing this phase of state highway maintenance in our annual contract maintenance programming.

TRAFFIC ENGINEERING DIVISION

The two main phases of the Traffic Division's activities are Highway Planning, with its subdivisions of sufficiency inventory, census and road life, field data, traffic counts, origin and destination studies, project analysis and special studies; and General Traffic Engineering, with highway design, traffic control signals, flashing beacons, safety lighting, traffic signs, pavement markings, traffic regulations, accident analysis, speed control and parking. Also, radio communications, which although not truly a traffic function is a responsibility of the Traffic Engineering Division due to its electronic nature and similarity with other electronic traffic equipment.

HIGHWAY PLANNING

The Highway Planning Unit continued to gather, evaluate and furnish traffic data and information during 1961.

In connection with the preparation of the very important Interstate Highway Cost Estimate, documentation of the data has continued during 1961.

Data developed in this estimate has been used during 1961 for making traffic forecasts and in the determination of interchange and ramp locations.

Projects for computer programs in the unit continued during 1961. One of these was the cooperative project with the Bureau of Public Roads conducted by the Massachusetts Institute of Technology. The project involved a computer program for mileage statistics for road systems control sections. Work is also proceeding on development of a traffic model for origin and destination analysis in the southeast area of the state.

The computer program for processing of traffic data from traffic counting devices has been extended to five of the eight Districts throughout the state. Truck weight studies which have assumed a greater importance because of Federal taxation of these vehicles were conducted at thirteen locations throughout the state.

The Annual Traffic Flow Map showing the average daily traffic at various highway locations throughout the state was published and released for general distribution.

In order to meet the modern techniques of data processing and to fulfill the need for more reliable traffic volume information the Department purchased 40 analog to digital portable recorders plus the associated translator. Although at the present time, this equipment has not been received, it is evident that this equipment will expedite the processing of the field tapes into I.B.M. cards which in turn will produce a traffic volume summary sheet in a very short time. In effect, this equipment will reduce the many tedious manhours for processing a single stamped tape to minutes, with all operations performed automatically.

With the advent of multilane expressways the need of vehicle detection by overhead devices has been a major problem. This year a test site was established on the

Southeast Expressway, northbound roadway, in Quincy utilizing the principle of ultrasonic detection. At this time tests are still being conducted to determine the accuracy of the detectors from a counting viewpoint.

In the future another test site employing the infra-red principle of detection will be installed on the Southeast Expressway, southbound roadway, in Quincy,

ACCIDENT ANALYSIS

In the Accident Analysis Section, the segregation and classification of state highway accident reports furnishes a complete accident record on these highways. Primarily, the record is used to assist in the preparation of traffic reports proposing remedial measures for correcting accident-prone locations by engineering means.

Accident reports at specific locations accompany recommendations for the installation of traffic control signals, special signs, highway illumination, special pavement markings and for corrective designs at certain intersections or the reconstruction of other hazardous locations.

Accident reports of a more general nature, such as comparisons of hazard on limited access and full access highways, serve to influence policy in road construction both locally and nationally.

SIGNALS

In the section pertaining to traffic control signals, in addition to the maintenance of existing signals and the installation of new signals, the installation of the so-called "minor movement control" has been extended. This feature has been installed at numerous signalized intersections where left turns are frequent, in order to provide a safer and more efficient movement of traffic at the intersection.

The installation of 12-inch lenses at certain signalized intersections has also been extended. These installations have been approved at locations where the larger lenses are deemed necessary for safety because of their greater target value.

There has been increased activity in the erection of specially illuminated barriers on highway construction projects.

With the stage construction of the Interstate System and the reconstruction of Route 128, the forewarning of high speed traffic of the termination or partial closure of a highway is vitally necessary from a highway safety standpoint.

During the past year barrier installations were made at over 30 locations on state highways. A special barrier system was installed in Medford on Interstate 93 where three (3) barriers were installed in succession approaching the end of construction, thus giving advance warning to high speed traffic on a four-lane highway and narrowing the traffic into two lanes and ultimately into the exit ramp at the terminus of the highway.

Special "spot" highway illumination has been installed at certain potentially hazardous locations on projects under construction.

SIGNS

A program instituted in 1960 in the Traffic Division of signing the completed sections of the Interstate System of highways has been continued. This is being carried out in accordance with the Interstate Standards developed in 1958 in The American Association of State Highway Officials Manual for Signing and Pavement Marking, and approved on February 21, 1958 by the U.S. Bureau of Public Roads.

Directional signs on the expressway proper at interchanges and at off ramps are mounted over the highway on supporting spans which extend between the median and the edge of the highway. New criteria and designs for signs are now available for use, including a new type of footing. Fullest use is made of the latest material available in design data for signs and sign supports.

The sections of Interstate Route signing which have been completed are:

Route 93 - From Medford to Salem, N. H.
Route 495 - From Route 3 south to Littleton
Route 195 - From East Providence, R. I. to Swansea
Route 290 - Worcester Expressway - a 5-mile section in the center of Worcester

Re-signing to Interstate Standards is being conducted on Route 95, north from Danvers to the New Hampshire line. On Route 128 the existing signs are being renewed, revised, and relocated.

SPEED CONTROL

Under the speed control program the usual comprehensive studies have been made in extending speed zoning on the state highways.

Assistance was given to all municipalities requesting aid in the preparation of regulations governing the speed of motor vehicles on municipally-owned roads.

During last year such assistance was given to 43 municipalities. In this period, on 29 sections of state highway and on one or more streets in each of nine municipalities, speed regulations were submitted by the Division for approval by the Commissioners of the Department and the Registrar of Motor Vehicles, acting jointly.

HIGHWAY DESIGN

Under the highway design program, plans of highways proposed for construction or reconstruction have been reviewed by the Traffic Division from the standpoint of traffic safety and efficiency.

New and revised designs have been adopted.

As the number of shopping and industrial centers adjacent to the state highways increase, new traffic problems arise. This Division has prepared plans at these centers for access to provide maximum safety for both through traffic and for traffic entering and leaving the centers.

SPECIAL ACTIVITY

A new Manual on Uniform Traffic Control Devices for Streets and Highways was prepared by a National Joint Committee and was released by the Bureau of Public Roads in June, 1961. The actual manual was received for use in late August.

Among the most important changes required by the Manual is the requirement of the use of yellow pavement-marking paint in the marking of barrier lines at no-passing zones. Another major change relates to traffic signal control, where the use of "walk" and "don't walk" indications will be required to replace the simultaneous red and yellow indication in pedestrian intervals. This latter change will require legislation which has been introduced by the Department for consideration in the forthcoming session of the Legislature.

In order to obtain statewide uniformity in applying standard methods of traffic control on Interstate and non-Interstate state highways and on municipally-owned streets and highways special efforts are being made in the preparation of new state manuals.

TWO-WAY RADIO COMMUNICATIONS

During the past year the Department operated and maintained a statewide two-way radio communication system. The system is licensed by the Federal Communications Commission and operated under the Rules governing the Public Safety Radio Services.

Forethought in planning the system in 1951 by requiring narrow band equipment is now resulting in considerable savings. The Commission's recent ruling making use of narrow band equipment mandatory in the Public Safety Radio Services has required only minor technical adjustments and a small cash outlay for new parts. Relatively large costs for compliance with these new rules are now being experienced by other Departments for modernization or replacement of state-owned radio communication equipment.

In accordance with the Rules of the Federal Communications Commission, a changeover of radio frequencies was made on all Department equipment by Department radio personnel during the past year. The efficient use of State forces on this mandatory changeover kept service interruptions at a minimum and reduced costs to the lowest possible minimum for a statewide operation. This is in keeping with the Department's preventive radio maintenance procedure which was set up in 1951. Under this procedure the bulk of the maintenance is done by our technicians but in order to insure prompt and efficient service to the Districts, supplementary radio maintenance contracts have been awarded in those areas where their services would insure uninterrupted District communications.

At the present time the system consists of eight base stations located in each of

the Engineering Districts with a monitoring control point at Department Headquarters at 100 Nashua Street, Boston. Auxiliary stations have been added as needed to insure District coverage. There are presently 295 radio-equipped vehicles, 2 "walkie-talkies" and 3 radio relay links.

Advisory and technical radio services have been provided for the Public Beaches Section and the Department System has been coordinated with the State and Federal Civil Defense network.

At the request of the American Association of State Highway Officials the Traffic Engineer continued to act as the Regional Member of the Committee on the Use of Radio in State Highway Departments. One hundred and twelve letters of comment and/or clearance were issued to applicants for frequencies in the Highway Maintenance Radio Service in New England and the Middle Atlantic States for attachment to their applications to the Federal Communications Commission. This is a pre-grant requirement under Part 10 of the Commission's Rules Governing the Public Safety Radio Services. Without evidence of compliance these applications are invariably returned.

The radio communications systems engineered and installed at Salisbury, Scussett and Horseneck beaches for the Beaches Section as indicated in our last report, were removed and stored at the Wellesley Depot for the Winter. They were reinstalled in May of this year for the summer beach season. Classes in radio-telephone procedure and in the nomenclature and operation of the equipment were held at each beach. Approximately 180 beach employees completed the course and were issued permits to operate the equipment.

Engineering assistance was rendered the Location and Survey Section in the procurement of portable radios for use of survey teams. Reports indicate these radios are now an essential survey tool for certain areas.

TELEVISION

During the past fiscal year, the closed circuit television system consisting of 16 cameras and associated monitoring equipment was operated and maintained in the Dewey Square Underpass for the Central Artery in Boston. This system is used for observation of traffic conditions within the tunnel. Because of the scope of the work and the necessity of maintaining this system in good order, specifications were drawn by the Department and a contract for the maintenance was awarded for the fiscal year.

TELLUROMETER

The tellurometer is an electric device designed for measuring distance. This equipment is operated by Location and Survey crews and maintained by the radio personnel of the Department.

RADAR SPEED METERS

These electonic units have been employed in speed control studies to determine proper highway speeds for highway safety, and in determining safe speed levels as they affect highway design. The equipment is maintained by Department radio personnel. During the course of the year, advisory assistance in procurement licensing and use of these meters were furnished to interested State and municipal agencies.

THE PLANNING DIVISION

Under the technical guidance of the Planning Division, the various District design and planning engineers are preparing a manual entitled Compilation of Auto Route Data. The compilation is actually an inventory of roadways and will ultimately comprise eight large volumes, one for each District, which will show the type and width of road surface, year built, date of latest major maintenance work, type of shoulders, horizontal curvature, sight distances, grades, design and travel speeds, locations of accidents, traffic flow and local land use adjacent to the highway. All of the enumerated data will be on a single sheet facing a topographical map delineating each state highway and auto route, and will show the highway route number and the Federal-aid system number, if any.

With the Planning Division as coordinators, the Department of Public Works and the U. S. Bureau of Public Roads are continuing the joint co-operative research program with the Massachusetts Institute of Technology in the electronic computer field. As a result of many new programs becoming adaptable to the computer, increased use has made it mandatory for the Department to establish a separate unit for the computer engineering force. Computer liaison engineers have been appointed in each Division and are being trained to use the latest methods of preparing information acceptable to the computer.

The Standard Specifications for Highways and Bridges, as well as all instructional manuals for the various engineering divisions, are in the process of being up-dated.

During the first eleven months of operation the Department-owned helicopter flew over 300 hours. Utilization consisted of aerial photography, preliminary highway location studies, cooperative traffic checks with the Registry of Motor Vehicles, traffic studies, progress studies, coastal erosion studies, construction inspection and, on one occasion, participation in a search for a downed plane at the request of the Civil Air Patrol.

At the request of this Division, the Department of Public Works filed legislation to codify the highway laws of the Commonwealth. The bill was referred to the recodification counsel for study.

The Planning Division is presently making a study to determine the feasibility of installing modern equipment, including new techniques, for the speedy reproduction of plans and documents.

Programming of funds, for the improvement of through routes on state highways and for the reconstruction of bridges, is also a function of this Division.

OFFICE OF STAFF ECONOMIST

There is a growing realization of the importance of the social and economic impact of highways on the Commonwealth and the specific communities and areas within it.

Federal contributions for planning and research are set at a figure of 1½ per cent of total Federal grants to the states toward the construction of the Interstate Highway System. In Massachusetts, the 1½ per cent will amount to a number of millions of dollars

Grants for this research are on a 75-25% basis, that is, the Federal Government pays 75% of the cost and the remainder is borne by the Commonwealth. Other Federal contributions result in total contributions by the Federal Government of approximately 77% of total costs of this work.

The Staff Economist, has been able to recruit, on an unpaid basis, the services of a top level, active and continuing committee of teachers and researchers from educational, financial and governmental institutions.

Out of the efforts of these experts were developed three fields of activity in which there should be major concentration by the Office of the Staff Economist, other than in the day-to-day internal servicing of the Department.

These were:

(1) An immediate gathering together of the "tools" whereby the research program could be best implemented, notably a research library and published analysis of methodology, techniques and review of previous efforts throughout the nation and in other countries.

(2) Contract with colleges and universities to arouse interest in the research area particularly in the form of masters and doctorate theses, but high grade work by undergraduates was not to be eliminated from consideration.

(3) Long-range social and economic highway impact studies to be made in several specific segments of the state, before, during and after construction. Particular emphasis was to be given to (1) an area that has come to be known as the "Route 495 Wedge" comprised of 27 communities encompassed by, traversed by or immediately adjacent to Routes I-495, 128, 135, and 2, (this is a "growth" area providing a "laboratory" for the study of the interrelationship of highways and urbanization) and

(2) the Merrimack Valley, where much of the area has suffered chronic depression of sufficient depth as to be classified as distressed under the terms of the recently enacted Federal Area Redevelopment Act. The prime thought is to examine the social and economic effects on different types of areas of Interstate Route 495 in terms of before and after studies, with the purpose of developing knowledge useful to the entire highway program.

There has been established a presently inadequate, but growing, library of important literature in the field, which has been of considerable value to many persons interested in this field of research. All of the four-year colleges and universities in the state have been contacted and many have expressed much interest in the Department's efforts in this field.

Two students worked without compensation for one day a week for a full academic year in the Office of the Staff Economist, several others assisted on particular assignments and one full professor obtained a private grant to do supplementary research on the "Route 495 Wedge," studying potential labor-force impact.

During the year the Office of the Staff Economist produced the following documents:

Social and Economic Impact of Highways: A List of Publications on the Social and Economic Aspects of Highways In Preparation by the Massachusetts Department of Public Works, 4 pages

Social and Economic Impact of Highways: Suggested Areas of Research for Study of Highway Impact, 18 pages

Social and Economic Impact of Highways: Population of Interstate Route 495 Wedge, 55 pages

Impact of Highways With Particular Reference to the Merrimack Valley, 20 pages

Social and Economic Impact of Highways: Review of Important Studies and Selected Bibliography, 87 pages

Social and Economic Impact of Highways in Massachusetts: Statement of Operations, 31 pages

Approximately 4,000 of these publications have been distributed. Distribution has been to a majority of the states in the nation and to as distant points as the British Isles, South America and Asia.

Requests for copies of the publications have ranged from college undergraduates to state departments of highways and public works, with very heavy concentration among the latter; municipal and regional planning boards and research libraries. An extensive mailing list has been developed and the Department takes pride in the request of the U. S. Bureau of Public Roads for 150 copies of one of the publications for that agency's internal use.

SAFETY SECTION

The Safety Section has continued the campaign to prevent accidents.

In 1960, there were 341 accidents including 131 involving motor vehicles. Since 1953, there has not been a single fatal accident to any of our employees while on the job.

Pit, truck and fire inspections, along with building inspections, have continued and any defects corrected.

District 1 received the Massachusetts Safety Council Motor Vehicle Accident Reduction Contest Award in having the lowest number of accidents per mile driven.

In recent years, over 1,000 employees have received instructions in First Aid and all have passed the Standard First Aid Course. This will be of value in our Civil Defense program in the Commonwealth.

In the year 1960, the Department gave a total of 515 awards for safe driving to our personnel. Over one-third of our employees have been driving ten (10) years without an accident.

Our state equipment has excellent safety standing. Large oscillating lights are now in use on trucks and vehicles working on the Central Artery, Route 128 and other main highways in the Commonwealth. Our flagmen are equipped with reflectorized vests for the protection of our employees and the motoring public while personnel are deployed on work projects.

SAFETY CERTIFICATE
This Is To Certify
THAT ON _____
IS HEREBY COMMENDED FOR HAVING
FOR A PERIOD OF _____ YEARS
Operated Massachusetts Department of Public Works Vehicles
without injury to himself or others or damage to property,
and has thus proved himself to be a careful, capable driver.
_____
Commissioner

WATERWAYS and BEACHES...

Shore protection work- Hull

The Division of Waterways has a diversified line of functions. The Division operates as two sections--the Rivers and Harbors Section and the Public Beaches Section.

The chief functions and duties of the Rivers and Harbors Section, under Chapter 91 of the General Laws and Special Acts of the Legislature, are as follows:

1. Shore Protection Work:
   Constructs and repairs sea walls, groins, bulkheads; nourishes beaches by placing sand.

2. Harbor Development (excluding Boston Harbor and larger commercial harbors under control of U. S. Engineers)
   Dredges channels and mooring basins, constructs and repairs jetties, breakwaters, piers, bulkheads, boat launching ramps.

3. Stream Clearance and Channel Improvements:
   Straightens and clears channels of rivers and tributaries, protects banks from erosion, improves drainage in low swamp and marsh areas.

4. Public Beaches (other than State and M.D.C.)
   Places sand, constructs groins, sea walls and bulkheads.

5. State Piers:
   Constructs, operates and maintains state-owned piers at New Bedford, Fall River, Gloucester, and Plymouth.

6. State Lands and Parks:
   Supervises and maintains Pilgrim Memorial Park in the Town of Plymouth; maintains the state boundary markers.

7. Tidal Waters, Connecticut and Merrimack Rivers, Great Ponds: Removes sunken vessels, derelicts, and marooned dead aquatic mammals; prevents encroachments in tidal waters and non-tidal sections of the Connecticut and Merrimack Rivers; licenses all work in tidewaters, great ponds (ponds over 10 acres in their natural extent), and in improved sections of non-tidal streams.

8. Co-operation with other Agencies:
Co-operates with the Federal Government on major harbor improvements, flood control projects, and beach erosion studies and projects.

Furnishes the Highway Division of the Department with hydraulic data for drainage and bridge design.

Stream clearance and channel improvement- Wellesley

OUR BEACHES OFFER TOPS IN RECREATION

salisbury Salisbury Beach is about an hour's drive from metropolitan Boston and has provisions for parking over 3,500 cars. Four miles of shoreline face the Atlantic Ocean, with ample accommodation for as many as 100,000 bathers. Picnic tables are available at no cost. Plans are being made for the construction of a public marina at Black Rock Creek, a tributary of the Merrimack River. This will be a part of the beach reservation.

westport Horseneck Beach, in the town of Westport, at the westerly entrance to Buzzards Bay, is less than a half hour's drive from the cities of Fall River and New Bedford. There are approximately three miles of beach and parking areas for 4,500 cars. The beach and adjacent dune area contains 564 acres of land, which allows ample room for picnics. On a busy summer Saturday or Sunday as many as 60,000 visitors are easily accommodated.

sandwich Scusset Beach on Cape Cod Bay, is just north of the entrance to Cape Cod Canal, and is easily reached from the state's eastern urban centers. The area consists of approximately 380 acres of land with about a half mile of beach. In addition there are fishing piers projecting into Cape Cod Canal for the use of sports fishermen. Parking areas have a capacity of 2,200 cars. Picnic tables are available in the beach area.

provincetown Provincetown Beach is located in the picturesque Province Lands at the tip of Cape Cod. There is about a half mile of fine beach with parking facilities for about 1,000 cars. At nearby Race Point, part of the Province Lands, there are parking areas and picnic tables.

PUBLIC BEACHES SECTION

The chief functions and duties of the Public Beaches Section are as follows:-

The construction, maintenance and operation of State-owned beaches at Salisbury, Scusset in the Town of Sandwich, Provincetown, and Horseneck in the Town of Westport.

The construction program varies from year to year. The volume depends primarily upon appropriations of the Legislature.

At Salisbury Beach, a garage and workshop is currently under construction. This will provide adequate garaging for all the beach equipment during the off-season.

Maintenance is a continual process at all the beaches, minor work is done by the few full-time employees of the section. Major repairs and maintenance are done by outside contractors through competitive bidding.

Operation is the largest function of the Beaches Section; the beaches are opened to the public from the middle of June until Labor Day. All the beaches have bath houses and separate sanitary facilities. Registered nurses are in attendance. Conservation helpers keep the beaches and facilities tidy and act as parking attendants.

Life guards are on duty seven days a week and are selected only after having passed rigorous physical and life saving tests. At all the State beaches the life guards are trained in the use of radio communications and the use of "walkie-talkies"; only the latest and best equipment is used.

Another function of the Beaches Section is the supervision of the Province Lands situated in the Town of Provincetown at the tip of Cape Cod. At present the Province Lands contain approximately 3800 acres of land, part of which will become a part of the new Cape Cod National Park.

The Beaches Section this past year has acquired Fort Phoenix Park in the Town of Fairhaven. Rehabilitation has started and it is expected that by next summer the area will be open to the general public for bathing.

PROJECTS ADVERTISED BY THE DIVISION OF WATERWAYS

FROM NOVEMBER 1960 TO NOVEMBER 1961

CONT. NO.	CITY/TOWN	LOCATION	TYPE OF WORK	EST. COST
2156	Barnstable	Veteran's Memorial Park	seawall & groin	$ 5,306.00
*2314	"	Centerville	seawall	2,500.00
*2317	"	Hyannis Harbor	bulkhead	130,000.00
2159	Boston	East Boston	dredging	65,960.00
2150	Bourne	Buttermilk Bay	seawall & groins	8,550.00
2190	"	Pocasset River	docking facilities	36,819.75
2252	"	Monument Beach	" "	25,880.00
2142	Brewster	Various locations Cape Cod Bay	groins	20,187.50
2162	Danvers	Danvers River	dredging	148,216.00
2256	Dennis	West Dennis Beach	bulkhead	18,472.00
*2325	Dennis	Vic.Dr. Lord's Road	stone revetment	30,000.00
2199	Edgartown	Edgartown Harbor	removal of wreck	2,940.00
2195	Edgartown & Oak Bluffs	Sengekontacket Pond	jetty construction	53,824.00
2287	" "	" "	channel dredging	54,820.00
2158	Falmouth	Shivericks Pond	drainage	12,883.20
2255	"	Wild Harbor	boat ramp	5,533.00
2291	"	Old Silver Beach	groins & beach restoration	17,282.50

CONT. NO.	CITY/TOWN	LOCATION	TYPE OF WORK	EST. COST.
2250	Gloucester	Fish Pier	rehabilatation of refrigeration facilities	$ 163,000.00
2253	Grafton & Shrewsbury	Irish & Hovey & Stringer Dams	spillway reconstruction	152,095.00
2264	Harwich	Allen & Wychmere Harbors	dredging	114,000.00
*2289	Holbrook	Trout Brook	stream improvements	30,000.00
2186	Holyoke	Connecticut River	bank protection	31,722.50
2329	Hull	Gun Rock	shore protection	16,680.00
2302	"	Kenberma	sea defenses	660,505.00
2067	Ipswich	Farley Brook	drainage	47,085.00
2308	"	Town Wharf	reconstruction	22,300.00
2283	Marblehead	Riverhead Beach	boat ramp	3,313.75
2230	Nahant	Forty Steps Beach	seawall	35,605.00
2286	New Bedford	State Pier	pier repairs	104,665.00
2227	" "	Acushnet River	pier & bulkhead	574,778.00
2141	Newbury	Plum Island Shore	stone groins	44,980.00
2149	Newburyport	Merrimack River	bulkhead	13,573.50
2148	Northbridge	Blackstone River	channel improvements	14,400.00
*2316	Oak Bluffs	East Chop	groin construction	10,000.00
2154	Orleans	Rock Harbor	bulkhead repairs	11,937.00
2169	Provincetown	Provincetown Harbor	dredging	40,140.00

CONT. NO.	CITY/TOWN	LOCATION	TYPE OF WORK	EST. COST
2313	Revere	Sales Creek	stream improvement	$ 7,650.00
2066	Russell	Westfield River & Potash Brook	channel improvements	57,362.50
2205	Salem	Salem Willows	seawall	23,995.00
*2206	"	Forest River	tide gates	60,000.00
2245	"	Salem Willows	beach improvements	12,500.00
*2268	Scituate	Surfside Road	seawall repairs	15,300.00
*2090	Spencer	Sugden Dam	dam repairs	38,000.00
2164	Springfield	No. of Sixteen Acres Pond	stream improvements	56,960.00
2049	Upton	Jourdan Pond	dam construction	68,030.00
2262	Wareham	Onset Beach	seawall	9,495.00
*2163	Weymouth	Back River & Herring Brook	drainage	355,000.00
2198	"	Weymouth Back Rvr.	dredging	36,975.00
2243	Winchester	Aberjona River	stream improvements	29,200.00
*2242	Winthrop	Donovan Beach & Lewis Lake	drainage	28,000.00
*2321	Yarmouth	Parkers River	jetty extension	12,000.00
			TOTAL	$3,540,421.20

*Denotes projects which may reasonably be expected to be advertised before December 31, 1961.

The Good Old Days

This Report has been prepared and edited by the staff of the Massachusetts Department of Public Works. Photographs are by personnel of the Department.

ACME
BOOKBINDING CO., INC.

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